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Climate Change Governance and the Politics of Scale: Evaluating Local Climate Protection Policies and Practices in the United States and Germany

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Climate Change Governance and the Politics of Scale: Evaluating Local Climate Protection Policies and Practices in the United States and Germany

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by

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Abstract

When it became evident that the issue of climate change needed to be acted upon, it was projected as a global scale problem. To make this rhetoric concrete, the international relations logic that 'regimes' of cooperating nation-states are the most feasible approach to solving problems that are global in nature was adopted. While the national level has performed poorly in climate change mitigation action, as exemplified by the United States' refusal to ratify the Kyoto Protocol, Canada's subsequent withdrawal from the Kyoto Protocol in 2011 after initial ratification and, more recently, the United States withdrawal from the Paris Accord, a reconfiguration of the scalar context of climate change governance to the local scale has become more popular. The major sources and sinks of Greenhouse Gases (GHG) are deemed to be at the local scale; hence, it is considered as the most suitable spatial unit for climate mitigation action. However, for local climate action to replace aggressive national level actions in fulfillment of the commitments to the 'regime' of cooperating national governments, the number of local climate policy innovation, and depth and efficacy of individual local actions must be substantial. In fulfillment of its first core empirical objective, the study combined critical policy theory, qualitative interviews and Geographic Information Systems, to examine the innovation of local climate action plans in the United States. Relying on the policy documents, the webpages and progress reports of localities' climate action efforts, and in-depth interviews with climate protection managers of 21 and five local governments in the United States and Germany respectively, the second empirical exercise examined the efficacy of local climate efforts quantitatively, in terms of their Greenhouse Gas emissions reduction targets, and qualitatively, in terms of the challenges and opportunities in their efforts.

Contents

1 Introduction

1.1 Background

Although it is now clear that climate change is no longer an event waiting to happen in the future – its impacts are already being felt – the struggle over how it should be mitigated, is perhaps one of the most contentions and politically divisive issues since the turn of the century. In this dissertation, I argue that central to the struggle over how the global climate should be protected from anthropogenic climate change is the struggle over scale – the most suitable geographic organization for climate mitigation efforts. There have been competing narratives and platforms of action in terms of the geographic scale at which climate change mitigation should take place.

This dissertation revisits the debates surrounding the concept of geographic scale and, with the benefit of hindsight from three decades of debate, argues that scale should be conceptualize as an 'analysis of scale practice'. In other words, geographers, and any other researcher or analyst for that matter, should be concern with how scale is deployed as a practice by actors in a given political struggle, towards the attainment of their desired goals, rather than whether scale really exist. In analyzing scale practices as part of the given political struggle, it becomes apparent that scale can be deployed both discursively (with no concrete material existence) and materially (with concrete existence such as the tiers of state organization).

Fundamental to this dissertation's position on the discursive and material scale practices is the idea that the two ways of scale practice are not necessarily mutually exclusive; they sometimes mirror each other. The discursive local, city, urban etc., particularly in terms of climate change mitigation, have often been extrapolated materially to the local government tier (municipality, county, or town) of the state. In this dissertation therefore, the local scale is

considered as the organization of the local government, which could be cities, counties, towns, and townships.

The decision to act and the implementation of actual concrete actions have, for the most part, have consistently come from subnational state actors, who recognize their scale category within the scalar structuration when defining the areas of action in their climate mitigation efforts. The dissertation therefore empirically examines the leading form of the material scale practice of climate change mitigation – the local scale (municipal/county). The fundamental question is, does the local scale truly possess the 'willing' and 'ability' qualities often attributed to it in the discursive local scaling of climate action?

The position of this dissertation is that for the local scale to be the main platform for global climate change mitigation, the number and individual efficacy of local climate protection efforts must be substantial. Hence, (1) to improve the innovation of local climate action, it would first be significant to understand the mediating factors that either influenced or hindered pioneering localities decision to take up climate protection. Also, (2) to improve the efficacy of local climate actions in bringing about meaningful reduction in GHG emissions to meet the global goal of climate change mitigation, the capacities of these local climate protection efforts need to be examined.

1.2 Problem Statement

When it became evident that the issue of climate change needed to be acted upon, it was projected as a global scale problem and; hence, required a global scale solution. Through the formation of the United Nations Framework Convention on Climate Change (UNFCCC) and subsequent meetings of parties to the convention – Conference of Parties (COP) – national governments were expected to deploy their various tools of governance to meet their assigned GHG emissions reduction target towards global climate change mitigation. While this has not materialized, as exemplified by the United States' refusal to ratify the Kyoto Protocol and, more recently, its withdrawal from the Paris Accord, the configuration of climate change protection as a local scale issue is increasing in popularity.

The pioneering narrative, in favor of this scalar shift in climate action, is the 'think globally and act locally' rhetoric; a call for climate change to be viewed as a global problem, but the responsibility of localities to take mitigation action (Angel et al., 1998; Betsill, 2001; Betsill & Bulkeley, 2006; Brown & Purcell, 2005; Bulkeley, 2000; Deangelo & Harvey, 1998; Easterling et al., 1998). In this discursive process, the 'city'/ 'urban'/ 'local' is contrasted with the 'national' and the 'global' scales in terms of their respective willingness and ability to mitigate climate change – "the world needs the same science-based foundation for cities that the IPCC provides for nations" (Rosenzweig, Solecki, Hammer, & Mehrotra, 2010, p. 910). It is argued that the world's cities are the source and the solution to the problem of global climate change, given that they have become the habitat of most of the world's population (C40, 2017 Rosenzweig et. al, 2010). Urban energy consumption is estimated to produce 70% of global GHG emissions (UN-HABITAT, 2011). Local governments are also deemed to have the ability

to directly or indirectly control activities within their jurisdictions which influence GHG emissions(Tang, Brody, Quinn, Chang, & Wei, 2010).

This largely discursive reconfiguration of the scale of climate change governance has had material outcomes, to the point where LCAPs are now becoming the mainstream form of climate change governance. The US Conference of Mayors developed a climate protection agreement in 2005, with the goal of getting cities to commit to reduce their GHG emissions in line with the Kyoto requirement for the United States (United States Conference of Mayors, 2018). In 2014, a bipartisan network of U.S. mayors, called Climate Mayors, which now has about 407 members, representing about 70 million Americans, was formed to 'fill the leadership gap' left by the federal government (Climate Mayors, 2017). The number of, and memberships to, other both national and international – Transnational Municipal Networks (TMN) – trans-municipal networks for climate action is on the rise.

The question however remains if the 'city'/ 'urban'/ 'local' scale is indeed the most suitable geographic unit of action for global temperature increase to be kept below the 2□ C limit – the predicted threshold to prevent calamitous impacts of climate change – in the material sense. The fundamental question is, does the local scale truly possess the 'willing' and 'ability' qualities often attributed to it in the discursive local scaling of climate action? For this to be the case the innovation and efficacy of LCAPs must be substantial. The study therefore carried out two core empirical exercises – the examination of LCAPs innovation and the efficacy and capacity of LCAPs.

1.3 Research Objectives

This dissertation had two main objectives: understanding why pioneering localities chose to innovate climate protection policy, so as to suggest ways of increasing innovation; and

examining the efficacy and capacities of local climate efforts, highlining the factors that enable or challenge their efficacy

The specific objectives are:

1. Examine why pioneering local governments adopted Local Climate Action Plans (LCAPs) in the United States.
2. Evaluate the efficacy of the individual local action plans based on their set targets
    a. Have emissions increased or decreased?
3. Examine the capacities of localities on in their effort to bring about meaningful reduction in GHG emissions
    a. What are the challenges to successful implementation and outcomes?
    b. What are the opportunities for successful implementation and outcomes?
    c. What are the sources and funding mechanism for LCAPs?
4. Examine the jurisdictional capacities of localities and the strategies deployed to navigate jurisdictional barriers
5. Contribute to the theoretical debate on the concept of geographic scale

1.4 Justification of Study

At a time when global scale climate mitigation action has proven daunting and, yet, the globe is in dire need of climate change mitigation, my research, which examines the efficacy of local scale climate action plans in the United States (a country with modest greenhouse gas reduction success) and Germany (a country that has achieved relative success in the greenhouse gas reduction fight) with the objective of developing a framework of best practices for climate action at the local level, is very timely. This endeavor will not only serve as an important source

of information for future policy direction, in terms of the formation; implementation; and improvement of local climate action plans, but also, climate change mitigation in general.

1.5 Structure of the Dissertation

The dissertation is comprised of eight Chapters. Chapter two, which follows this introductory chapter reopens the arguments surrounding the concept of geographic scale, with the hope bringing clarity to it, particularly with regard how it should be applied by students of geography. The reason for going into the theory of scale is to put the various connotations of scale (local, urban, national, sub-national, regional, global), which are frequently thrown around especially in talking about climate change governance, into proper perspective.

Chapter three discusses the research design, the methods and the data used in the empirical analysis. The research is largely qualitative with some application of basic statistics and Geographic Information Systems (GIS) data manipulation.

One of the objectives of this dissertation is determine how to increase the adoption of LCAPs across the United States if not globally. Hence, using the sustainability data set collected by the International City/County Management Association (ICMA), chapter four examines the factors that influenced pioneering localities to take up climate protection in the United States. Through a GIS spatial analysis, in-depth interviews with LCAPs manager, and critical policy theory, the chapter argues that the single most important factor that influenced pioneering local governments to adopt climate mitigation efforts is political ideology.

Chapter five holistically examines the nature and efficacy of LCAPs in the United States and Germany. The chapter begins by discussing the process of developing LCAPs, followed by a highlight of the typical areas of action and types of policy instruments deployed. In addition, the current GHG inventories of the study localities are compared against their base year inventories

to ascertain the efficacy of LCAPs in meeting their set targets. Since this is not a comprehensive quantitative evaluation of the cumulative impact of all LCAPs in the United States and Germany on their respective national emissions, the goal is to ascertain the capacity and potential of individual localities to reduce their own Greenhouse Gas emissions (GHG). The types of funding opportunities, key enablers and the challenges of LCAPs are also discussed in this chapter.

In chapter six, the jurisdictional capacity of LCAPs is discussed. The first section addresses the questions of why climate protection is suited to the local jurisdiction. The second section then delves into the areas of action that are fundamental to the local area (municipality/county) by virtue of their jurisdictional and practical capacities. The chapter also, brings to light the areas of climate mitigation action that are important to the goals of LCAPs but are considered as existing beyond the capacity of the local scale. Besides, identifying the capacities of the local scales, particularly municipalities, in terms of their formal jurisdictional authority assigned to them by law, the chapter also examines the strategies that LCAPs adopt to circumvent such interjurisdictional boundaries. The final section of the chapter discusses the importance of networks and partnerships to LCAPs, with special attention to Transnational Municipal Networks (TMN).

Relying on the direct responses of climate protection managers and drawing from the forgoing discussion, chapter seven captures the specific areas of action as well as, the areas of research that need to be addressed to enhance the efficacy of LCAPs.

Chapter eight concludes the dissertation, highlighting the key findings.

2 Conceptualizing Geographic Scale as an Analysis of Scale Practice: Climate Change Governance and the Politics of Scale

2.1 Introduction

'Bad abstraction'(Paasi, 1998), 'illusive'(Collinge, 2006), 'troubling' and 'chaotic' (Howitt, 1993; Sayer, 1992) are some of the many ways in which the frustration with the concept of geographic scale has been expressed. Marston, Jones & Woodward (2005) even go as far as calling for its outright removal from the discipline of geography. Yet, somehow, "the question of scale [la question d'echelle] inserts itself at the outset—at the foundation, as it were—of the analysis of texts and the interpretation of events" (Lefebvre 1976, cited in Brenner, 1997:137). My goal in this chapter is not to add to the confusion by attempting to answer the question 'what is scale?' (Sayre, 2005: 280), but to bring clarity in terms of how it should be applied by students of geography. It is my firm believe that with the benefit of hindsight, drawn from three decades of debate, the problem of how geographic scale should be operationalized can be addressed by answering the question: "Just what it is that we do when we invoke the concept of scale to understand spatial-political practices?" (Jones, 1998: 28). Over thirty years of intense back and forth debate, how has scale been deployed empirically?

The paper begins with a review of the pioneering discussions on the 'social production of scale' (Marston, 2000). Particular attention is paid to the political economy (dynamics of capitalism) inspired works of Peter Taylor (Taylor, 1981; Taylor, 1982) and Neil Smith (Smith, 1984; Smith, 1992); and, then, Marston's (2000) call for attention to other structural forces such as patriarchal relations in the social construction of scale. This sets the background for what I will describe as the conceptual complication of scale in the section that follows, taking on the body of work described as the 'the politics of scale' (Cox, 1998b; Herod, 1991; Howitt, 1993;

Smith & Dennis, 1987; Smith, 1992; Swyngedouw, 1997a; Swyngedouw, 2000a). The chapter asserts that attempts to address the inherent rigidity of the early scale conceptualizations of Taylor and Smith by establishing the relationality (the politics of scale) of scale comes with struggles to locate or dislodge the hierarchy/verticality in scale. These struggles are revealed in attempts at (1) establishing the relationship between the scale metaphor and the real nature of social relations, and (2) the construction of the 'gestalt of scale' (Swyngedouw, 2004)/ 'scalar structuration' (Brenner, 2001a). The next section addresses the ontological problem that has arisen from the difficulty in placing spatial relations, which are evidently, fluid in the context of scale. Poststructural scholars have described scale as merely an epistemological ordering frame and, so, seeking to interpret social phenomena as though they flow through really existing 'gestalt of scale'/ 'scalar structuration' is untenable (Jones, 1998; Kaiser & Nikiforova, 2008; Marston, Jones, & Woodward, 2005; Moore, 2008). Others, arguing from a critical realist corner, acknowledge the epistemological strain of scale, but insist that there is real scaling ((Leitner & Miller, 2007; MacKinnon, 2011; Miller, 2009; Swyngedouw, 2004). This chapter, however, takes the position that scale is a dimension of spatial practices and, for that matter, the question of its ontological status is moot – it can be invoked discursively and materially (such as the bureaucratic tiers of the state).

Synthesizing the various debates on the production of scale, the final section revises the empirical cases of some of the early influential conceptualization of scale (Herod's analysis of labor relations in the United during the New Deal Era; Howitt's examination of Aboriginal people's employment in the mining industry in the Australia; and Miller's study on the peace movement in Cambridge Massachusetts) as examples of scale practice. The paper also examines the climate protection discourse and the concrete policy actions taken to mitigate climate change

in furthering the argument that geographic scale should be conceptualized as analysis of scale practices. The argument is that as part of the political struggle in dealing with climate change, the problem and its solution have, at various times, been projected at various scales, with various material consequences; the idea of finding the scalar fit for the problem and its solution.

2.2 The Social Production of Scale

It has become something of a truism that scale is socially produced; perhaps, the only consensus on the concept (Marston 2000). The overarching premise of the notion of 'the social production of scale' is that scale should not be viewed as the preexisting demarcation of the world into a hierarchy of circumscribed spaces, cascading from the "global", through the "national" and "regional" to the "local", but an emergent of broader social practices (Marston, 2000; Smith, 1984; Smith, 1992; Taylor, 1982). Taylor initiated the debate on the social production of scale from a materialist political economy perspective – a position which insists on the inseparability of the political and the economic (Taylor 1982). His work, and those of other succeeding materialist scholars, was influenced by the conspicuous spatial restructuring that followed the onset of the nation-state system under industrial capitalism (Herod, 1991; Smith, 1984; Smith & Dennis, 1987; Taylor, 1982). Given this apparent inseparability of the political and economic, Taylor (1981;1982) argued that spatial scale is much broader than the superficial demarcation of the world into local, regional, national and global politics (Taylor 1982). The phenomena that constitute the urban, national and global scales comprise both state and non-state entities, and it is only through the materialist perspective of political economy that the true nature of scale can be attained (Taylor, 1982). The materialist position considers 'production' as the underlying principle of all forms of human existence, both past and present (Swyngedouw, 2000b). The relations emanating from the production process, in other words, the overall

economic structure of society, forms the platform for legal and political activities (Swyngedouw, 2000b; Taylor, 1982).

Taylor viewed the world-system under capitalism as anchored by the three-tier scale – urban, national and global – each playing specific roles to sustain it. He gave priority to the global scale in terms of causal power within the world system and described it as the scale of reality. Hence, the environmental and economic outcomes in space are to be seen as the product of decisions of the global scale (Taylor 1982). He emphasized that although the urban and national scales are as real as the global scale, it is the latter that influences the characteristics and outcomes of the former two. The national scale, on the other hand, he described as the scale of ideology, in that, it is the realm of political decision making and the sphere to which the citizenry is socialized into an unwitting loyalty to the 'national interest' (Taylor 1982). The importance of the national scale to the world-economy lies in the fact that it adjudicates the decisions of the global scale to avoid conflict with the masses at the urban scale (Taylor, 1981; Taylor, 1982). Finally, he considered the urban scale as the scale of experience; asserting that it is at this scale that the material impacts of decisions of the global scale (facilitated by the national scale) are felt. It is at the urban scale that humans' daily material encounters - shopping, schools, hospitals jobs etc. take place (Taylor, 1982).

Neil Smith (1984;1992) followed Taylor's lead with a detailed description of the various scales, distinguishing each scale category based on its identity (there specific characteristics that makes it coherent); internal differences; borders with other scales; and the political struggles associated with their production (Smith, 1992). What is identified as the global scale, according Smith (1992), is a product of the globalization of the world market in the late 19th century: "the global scale is primarily a construct of the circulation of capital" (Smith, 1992:76). Additionally,

the national scale is the locus of political power – the seat of the state – unlike previous state forms such as the city states of Greece and West Africa, where political power resided in the urban scale (Smith 1992, Smith, Dennis 1987, Smith 1984). Like Taylor, smith described the urban scale as the most material of all the scales, in that, it is the scale of the everyday material practices of individuals (Smith 1992, Smith 1984).

Based on Taylor and Smith's discussions, scale is socially constructed and historically constituted through capitalist economic activity. Once produced, they are identifiable by certain characteristics; talk about the urban, national and global scales and one will be able to mention certain practices, objects and agents that are contained in them at a given time. Both Taylor and Smith's theorization suggest some homogeneity and identifiable geographical range of the various scales. However, the limits of these scales, most especially the urban scale, should not be confused with the administrative boundaries of the tiers of the state (Miller, 2009).

Taylor and Smith's early scale conceptualizations have been faulted for not only delivering a rigid conceptualization of scale, but also, limiting its production to economic forces (Herod, 1991; Howitt, 1993; Jonas, 1994). Marston (2000), with reference to the scale of the household, made a case for patriarchal social relations in the production of scale; extending the production of scale beyond processes associated with capitalist economic activity. She argued that a "more systematic consideration of social reproduction and consumption processes can open up the scale literature to an appreciation of the crucial role of patriarchal gender relations in the social construction of geographical scale" (Brenner 2001a: 595, Marston 2000). Other efforts to address the apparent rigidity in earlier conceptualizations of scale – espoused by Taylor (1981;1982) and Smith (1984) – and to further the discussion on the notion of the 'social

production of scale' resulted in a body of work termed the politics of scale, which, I ague in the proceeding section, have complicated geographic scale.

2.3 The conceptual complication of scale

2.3.1 Where is the hierarchy/verticality in scale?

Authors of 'politics of scale' literature (Herod 1991, Howitt 1993) sought to recognize cross-scale interaction (Cox, 1998a; Herod, 1991; Howitt, 1993; Smith, 1992; Smith, 1996) by highlighting the agency of mediating social actors in shaping scale. However, the problem has been reconciling the kind of socio-spatial arrangement that the metaphor of "scale" in the conventional sense evokes (hierarchy, ranking etc.) and the actual nature of socio-spatial relations (fluid and multidimensional). Scale suggests some form of ranking, be it in the form of size, hierarchy of political power, or geographic size (Bulkeley, 2005; Leitner, Sheppard, & Sziarto, 2008; Springer, 2014), but social relations are fluid (Collinge, 2006; Marston et al., 2005; Springer, 2014). The struggle to locate or dislodge the hierarchy inside scale has led to the development of various scale metaphors ('scale jumping', 'musical notes', networked 'space of dependence' and 'space of engagement' etc.) to a point where one begins to wonder if it is indeed scale that is being discussed.

Herod (1991) argued that what gets constituted and reconstituted as part of a given scale is not without contestation; hence, there is a politics to the production of scale (Herod 1991). He accorded agency to constituents of the capitalist system such as state institutions, labor and owners of factors of production in the production of scale, rather than leaving it to the automation of capital, as espoused by Taylor. The restructuring of the scale of labor relations in the United States in the New Deal era, for example, entailed "struggle and compromise between and among workers, bosses and the state" (Herod, 1991: 84). Herod further argued that on the

bases of this cross-scale interaction, an avenue is provided for the exercise and resistance of power; agents either decide to not recognize these scales or attempt to abrogate the boundaries and extend their reach to actors and processes at other scales (Smith 1992). It was therefore in recognition of this cross-scale interaction and the need to establish the fluidity of spatial phenomena that Smith introduced the concepts of "scale jumping" – the processes whereby agents within specific scales reach out to other scales as a way of mobilizing support in pursuit of their political goals (Smith 1996, Smith 1992).

In what Howitt (1993) evidently saw as polymorphic socio-spatiality, he took the relational argument further by underscoring that inter-scale relations are not unidirectional. The relationship between scales is not only limited to the fact that relations at one scale penetrate relations at other scales, but that the relationship is multidimensional, multidirectional and sometimes contradictory, suggesting that scalar relations should be thought of as dialectical (Howitt 1993). He proposed dropping the popular matryoshka doll metaphor of scale and utilizing musical metaphors for a better representation (Howitt, 1993; Howitt, 1998; Howitt, 2003). This throws the hierarchy/verticality inside scale back into the crucible and begs the question; why must it be a scale metaphor that explains the relations among, what is obviously, "elements of complex geographical totalities"? (Howitt, 1998: 49).

The struggle to situate social relations in 'scale' terms was even more conspicuous in Kevin Cox's effort to determine the dimension of local politics (Cox, 1998a; Cox, 1998b). Instead of accepting the notion of the urban scale, (as the tangible aspects of capital's spatial division of labor as theorized by Smith, 1992; Taylor, 1982) interacting with wider spatial scales – national and global – through 'scale jumping' (Smith 1984, Smith 1996, Smith 1992), Cox introduced the concepts of 'spaces of dependence' and 'spaces of engagement' and their

networked interaction as a better conceptualization of the politics of scale. Cox argued that capital is incessantly mobile and in constant search of higher profits across the entire globe, which ironically threatens the fixed inputs that it dependents on. Diverse agents of space – capitalist firms, workers, state agencies, and landowners among others – that also depend on these fixed inputs, pursue strategies that will ensure their durability. In pursuing their place specific interests, local agents form 'spaces of dependence' (Cox, 1998b: 2), but they also encounter very dynamic processes – market changes (competitions), government policies, among others – taking place beyond their bounds that "constantly threaten to undermine or dissolve them" (Cox, 1998b: 2). Thus, to prevent the annihilation of these 'place-specific' conditions (spaces of dependence), agents of place-specific interests deliberately construct networks to engage with these wider forces, forming what Cox calls 'spaces of engagement' (Cox, Mair 1988, Cox 1998b, Cox 1998a).

Cox recognized that constituents of local politics are not defined by the territorial bounds of the local state; hence, his decision to interpret local politics and the maneuvering of agents of local interest in terms of the network interaction of 'spaces of dependence' and 'spaces of engagement'. He rejected the use of the concept of 'scale jumping', by arguing that it implies scales are bounded spaces with their respective politics taking place within their boundaries. He therefore suggested conceptualizing the politics of scale in terms of networks – "Networks signify unevenness in the penetration of areal forms" (Cox, 1998b: 2). Cox's five case study empirical contribution to the politics of scale focused on how actors reach across scale in pursuit of their respective interests. A scale specific critique came from Michael Peter Smith (1998) who faulted Cox for failing to justify the existence of scale, (particularly, the global scale) except for merely implying it with the phrase, 'more global' to mean all extra-local scales and processes

(Smith 1998: 35). Cox was obviously very reluctant to perceive spatial relations as compartmentalized into the urban, national, and global scales, yet he would not dismiss the notion of scale altogether.

The 'politics of scale' literature is essentially conceptualizing scale as something different from its literal form. Despite the insistence among these scale scholars that scale is not hierarchical (Howitt, 193;1998; Cox, 1998b) "the burden remains on geographers to demonstrate with conviction and clarity how scalar ontologies can productively shed themselves of their implicit and explicit hierarchies" (Springer 2014: 410). In fact , Brenner (1998; 2001a) argues that it is precisely scale's hierarchical (vertical) character – ''the capacity of geographical scale to circumscribe and hierarchize social relations within relatively fixed and provisionally stabilized configuration is central to their role as sources of power and control over social space'' Brenner (1998a: 478) – that distinguishes it from other spatialities (place, space and networks) (Brenner, 2001b).

2.3.2 Defining the 'Gestalt of Scale'/ 'Scalar Structuration'

The lack of consistency and cohesion in defining the Gestalt of Scale'/ 'Scalar Structuration' is one of the areas of complication of scale. Particular attention is paid to the works of a more recent political economy scholar (Swyngedouw, 1992; Swyngedouw, 1996; Swyngedouw, 1997a; Swyngedouw, 1997b; Swyngedouw, 2000a; Swyngedouw, 2004) whose conception of scale is nuanced but nevertheless contributes to this type of scale complication.

Swyngedouw (2004), advocated for a process-based approach to scale, insisting that scale is in a "state of perpetual change, transformation and reconfiguration" (:14) which results in the old 'gestalt of scale' giving way to a new one – shifts in relative importance or position of various scales within the nested hierarchy, in other words, rescaling. The crux of his argument is

that the agency in social actors is not in their ability to interact across (prior) scales, but the transformation of scale itself. Swyngedouw was particularly interested in demonstrating that spatial practices do not come prepackaged in scales but are fluid and can be configured and reconfigured at different scales – the production of what he refers to as the 'gestalt of scale' (Swyngedouw 2004: 25).

> Geographical configurations as a set of interacting and nested scales (the 'gestalt of scale') become produced as temporary stand-offs in a perpetual transformative, and on occasion transgressive, socio-spatial power struggle. These struggles change the importance and role of certain geographical scales, reassert the importance of others, sometimes create entirely new significant scales, but—most importantly—these scale redefinitions alter and express changes in the geometry of social power by strengthening the power and control of some while disempowering others. (Swyngedouw 2004: 34)

Swyngedouw's assertion that the production of scale is fundamentally conditioned on social processes, related to specific spatial change gives fluidity to scale; however, there is a general lack of consistency and cohesion in defining the gestalt of scale. Brenner (2001a), as part of his eleven cardinal hypothesis on scalar structuration asserts that the pattern of scalar structuration (gestalt of scale) must be accounted for not only in terms of how, why, and when the given social phenomena got configured into interacting and nested scales (subdivided into a vertical hierarchy of separate yet intertwined geographical scales), but also, the appropriate spatial units which forms the bases for the nesting, because of the multiplicity of patterns of 'scalar structuration'. From the popular scale taxonomies used by Swyngedouw and others, however, the 'national' scale seems to be the derivative of the supranational and subnational (Collinge, 2005). So, if the nation-state (a political institution), and its territorial delimitation is taken as the national scale, then the logical implication is that the other scales will take the form of the "politically defined spaces whose institutional names (`regional', `local') they share" (Collinge 2005: 197). In effect, the territorial bounds of the entire world, will assume the

political institutions that involve the global cooperation of individual nation-state, hence, forming the global scale. It can therefore be inferred that these scales are configured based on the "spaces associated with the levels of the state" (Collinge 2005: 197).

Although the above configuration has some consistency and cohesion, in other examples of the configuration of scale given by Swyngedouw, it appears he uses the concept of scale and its various taxonomies – local, urban, regional, subnational, national, supranational, and global, to which social processes are projected to form the "interacting and nested scales (the 'gestalt of scale')" – as though they are known, already existing, empty frames (for which no prior definition is required) which are eventually filled with phenomena such as environmental regulation, capital-labor relations etc. For instance, he describes the shift in regulation of capital/labor relations "from some kind of national collective bargaining to highly localized forms of negotiating wages and working conditions" as a reconfiguration of the scale at which control and domination as well as cooperation and compromise take place (Swyngedouw 2004: 40). In this example, the 'national' and 'local' (similar to Herod's case of labor relations in the United States) are merely references to centralization and decentralization respectively, and has no bearing with the 'national', (as in nation-state), as the pivot of the various scale categories. With regard to the same example of the rescaling of the labor/capital nexus, he describes the "internationalization" of capital as 'jumping scales', as capital seeks to circumvent regulation at the national scale in search of competition at much wider scales. However, this could also mean shifting from the state to privatization in a horizontal conceptualization.

Swyngedouw introduced scales such as body, family, building, city, nation, ecological niches, communities, and international trade in his discussion of the everyday material practices of individuals (Swyngedouw 1997a, Swyngedouw 1997b). While the scales of the body,

building, city ecological niches, and nation can be perceived as scales based on the physical size of geographic space, a problem arises with regard to how other scales such as family, community and international trade and economic relations, which tend to be more socially defined, may fit in the same 'gestalt of scale' (Swyngedouw 1997b: 168, Collinge 2005).

There is a general lack of consistent tread defining the 'gestalt of scale' in these examples, except to demonstrate, albeit loosely, how certain regulatory practices and institutions shift from one scale to another. It is therefore common practice to superficially extrapolate various practices to the 'local', 'regional', 'national' and 'supranational' as though they (the 'local', 'regional', 'national' and 'supranational') are organically existing "standard reference areas of different sizes forming a series of scale levels" (Collinge, 2005: 197). "The meaning, function, history and dynamics of any one geographical scale can only be grasped relationally, in terms of its upwards, downwards and sideward links to other geographical scales situated within tangled scalar hierarchies" (Brenner 2001a: 605). Given that scale is inherently relational one would imagine that in every scale situation there would be a common relational focal point, forming the bases for determining the relative position of the various scale categories within the scale nesting. For instance, unless there is an identifying grid linking them, it would be difficult to argue that the 'building', 'body' and 'community' scales are higher up the nesting relative to the 'urban' or 'national' scales, or even, that they exist in the same nesting.

2.4 Scale a Misnomer? Sociospatiality and the ontological Status of Scale

Poststructuralist have argued that spatial processes do not exist in real or imagined hierarchies, but exist in multiple fluid sites (Moore 2008, Marston, Jones & Woodward 2005, Kaiser, Nikiforova 2008, Jones 1998); arguably, the reason for the demonstrable difficulty in placing sociospatial relations in scalar form, by the 'politics of scale' literature (Cox 1998b,

Herod 1991, Howitt 1993, Howitt 2003, Howitt 1998). This raises the question; is the concept of scales a misnomer?

Springer (2014) adopting Marston et al.'s (2005) position that a flat ontology should inform spatial politics, introduced the notion of 'human geography without hierarchy' to make more explicit the fact that things, ideas, and politics are not organically organized into a hierarchy of relations but can form a horizontal structure of interaction. "Flat ontologies consist of self-organizing systems, or 'onto-genesis' where the dynamic properties of matter produce a multiplicity of complex relations and singularities that sometimes lead to the creation of new, unique events and entities, but more often to relatively redundant orders and practices" (Marston, Jones et al. 2005: 422). 'Human geography without hierarchy' argues that "politics takes place around "multiple sites of horizontal activity and autonomous resistance" (Springer 2014: 409). Leitner, Sheppard et al. (2008) in their discussion of contentious politics also make a call for the careful look at the status of scale based on the ontology of spatiality. They highlight the fact that positionality of agents of contentious politics and the alliances they form are not predefined by a specific spatiality. "The spatiality of contested politics often connects people and places directly, horizontally across space" (Leitner, Sheppard et al. 2008: 160). Similarly, (Amin, 2004)Amin (2004) advocated for a non-territorial conceptualization of place, arguing that "transnational flows and networks no longer allow a conceptualization of place politics in terms of spatially bound processes and institutions" (: 33). It was based on this seeming ontological mismatch of the nature of sociospaital relations and the metaphor of scale that Marston et. al. (2005) called for scale to be replaced with flat ontologies in the discipline of geography.

Poststructural scale scholars (except for Marston, Jones & Woodward (2005) who call for scale to be jettison), however, argue that although actors and organizations neither move across

geographic scales through "scale jumping' nor networked interaction of 'spaces of dependence' and 'spaces of engagement' in the real sense, actors or agents in a given political struggle can deploy scale discursively (Collinge, 2006; Hoefle, 2006; Jones, 1998; Manson, 2008; Moore, 2008). Since agents or political participants invoke scale as a way of positioning their agenda in an advantageous position, by for instance, describing their issue as global or local, it means scale is a representational category (Jones 1998). "Scale is a fundamental building block used by actors to interpret and strategically construct their social worlds as opposed to being a fundamental feature of the social world" (Moore 2008). In simple terms, scale should be perceived as an epistemological trope that has been treated by Cox and others as an ontological real category. It is however emphasized that although scale may not exist out there in reality, "through deployment and social contestation, scalar representations can in turn have material effects" (Moore 2008: 205). In fact, Moore (2008) and others fault Marston et al. (2005) for founding their call for the rejection of scale from geography solely on scale's ontological status, while ignoring the fact that discursive scale practices have important material outcomes.

It is an ongoing argument that the acceptance of discursive scale practice does not mean that real material scale does not exist. (MacKinnon 2011, Miller 2009, Leitner, Miller 2007, Swyngedouw 2004, Brenner 1998, Brenner 2001a). Scale is, "above all, a diverse array of material and representational practices, shot through with power" (Leitner, Miller 2007: 119). Leitner & Miller (2007) give an example of material scale as the bureaucratic tiers of the state. The fundamental question therefore is, how is the notion of discursive scale and material scale reconciled? MacKinnon (2011) takes on this task from a critical realist position through his idea of 'scalar politics. He suggests that it is not scale per se that should be the issue of concern, but the specific political processes and institutionalized practices that are themselves differentially

scaled (Mackinnon 2011). This position is also consistent with Moore's earlier argument that one of the reasons for the conceptual complication of scale is its treatment as a category of analysis instead of a category of practice. If the focus is not on scale per se, but the practices associated with a given political struggle, and scale is not treated as an analytical category but a category of practice (although Moore's position was centered on scale as a representational category), then it is possible to sight material and discursive scales, through their deployment as part of the practices associated with given political struggles. Hence, scale as a category of social practice can be material (e.g. tiers of the state) or discursive. This paper, like other discussions on the production of scale 'over the past decade (Leitner & Miller, 2007; Mansfield, 2001; Mansfield, 2005; Miller, 2009), takes the position that scale is a dimension of social practice and the scale interest of geographers should be in terms of how it is deployed (materially or discursively) in specific political circumstances, and the associated outcomes – an analysis of scale practice.

2.5 Scale as an Analysis of Scale Practice

In this section, I conceive scale as a dimension of sociospatial practices and, as such, proceed to analyze some of the empirical cases of the early influential 'politics of scale' literature as scale practices. My position is premised on the assertion that scale practice is one among other dimensions of spatial practice such as space, place, and networks, that are produced in various political struggles (Brenner 2001a, Leitner, Miller 2007, Leitner, Sheppard & Sziarto 2008, Mansfield 2005).

2.5.1 The Early Empirical Cases of the Scale Literature

In Herod's discussion of the dynamics of United States labor relations in the Era of the New Deal, he described the scale at which labor relations exist as produced from the maneuvers of workers, bosses and states among others. The scale politics that Herod described in this case

was the shift in labor bargaining from a centralized (national scale) to a decentralized (local scale), plant specific, process, and its consolidation at that 'scale', through the actions of interested parties in the labor struggle. The scales produced in this struggle do not follow the contours of the urban, regional, national, and global scales, as, for instance, espoused by Taylor and Smith. The 'scaling' (in the case of Herod's) is specific to the institutional arrangements put in place to manage labor relations – centralized versus decentralization. For instance, the use of 'localize' can only be justified, in this case, (as espoused by Herod) by the fact that the control of labor relations is devolved to the plant level, rather than the reconstitution of labor relations at scales similar to Taylor and Smith's. So, in effect, it was the resulting resolution of the compromise that Herod referred to as scale.

In a brief examination of Aboriginal employment in Australian, Howitt attempted to illustrate that the local aboriginal land disenfranchisement and employment is dialectically related to local, national and international actions and processes. He discussed how on the one hand, national policy on mining and aboriginal employment was influenced by the mining lobby's projection of the mining industry as the means of solving the unemployment problem among aboriginals (perceived as a national problem). Yet, when such promise failed to be delivered, the mining lobby did not only deflect blame to parochial local interests, but also, made the problem the social responsibility of the national government and, and once again, presented the mining industry as the only actor to protect this 'national interest' (Howitt 1993). Howitt described these maneuvers as demonstrating the dialectical nature of scale relationships – local impacts upon the national and international; at the same time, the international and national impact on the local (Howitt 1993). However, the only indication of actual interaction across scales, in this case, is the discursive use of scale "in enabling particular relationships of power

and space that advantage some social groups but disadvantage others" (Jones, 1998: 28) – the mining industry [for a similar analysis see Jones (1998) on Cox's 'space of dependence' and 'spaces and engagement']. This is a classic example of actors invoking scale in their political maneuvers which, irrespective of whether those scales really exist or not, leads to outcomes that may be desirable to them.

Miller (1994;1997) brought to light the material scale practices of actors in a political struggle in his examination of the actions of the anti-nuclear weapons movement and the politics of defense spending in Cambridge, Massachusetts. Actors inherited the scale tiers of the state in their scale practice by presuming that the state's power is organically institutionalized at its various tiers (Miller, 1994; Miller, 1997) and sought to take advantage of the scales with the most political opportunity to advance their course. The fact that the nuclear armament project was a federal policy meant that the window of opportunity at the national scale was closed to the anti-nuclear campaigners, so they shifted their attention to the local scale; the Cambridge city council had a record of passing many pro-peace resolutions. The strategy was to pursue a Nuclear Free Zone (NFZ) campaign in favor of giving citizens the opportunity to decide the nuclear status of their communities. Miller's analysis does not only reveal material scale practice, in the context of actors inheriting the scale division of the state in their political pursuits, but also, the discursive use of scale. For instance, the pro nuclear movement, citizens against research bans (CARB), which emerged to oppose the peace movement, resorted to a discursive "scale jump" by delegitimizing the local state as the appropriate spatial turf for decisions bordering on defense, arguing that such matters are the jurisdiction of the national state. Additionally, CARB tried to conceal its own association with non-local organization in order not to compromise its own legitimacy in engaging in a local struggle (For a similar type of

scale practice, see Leitner's (1997) work on the construction of supranational framework for immigration controls for EU) (Leitner, 1997).

2.5.2 Global Climate Change Governance

Scale practice has been one of the key political maneuvers in the management of global climate change. The 'local', 'urban', 'city' 'national' and 'global' have, at various times, been invoked and assigned certain attributes, that make them either the suitable or unsuitable platforms for climate protection. These scales, in some cases, are deployed discursively, with some putative attributes and, without translatability into any concrete scales of action. Other instances, actors deploy them materially, inheriting, already existing constructions such as the scaled tiers of the states in the pursuit of climate protection.

When it became evident that the issue of climate change needed to be acted upon, it was projected as a global scale problem – "climate is a common good, belonging to all and meant for all" (Francis, 2015) – and; hence, required a global scale solution. A competing narrative, on the other hand, has been the 'think globally and act locally' rhetoric; a call for climate change to be viewed as a global problem, but requires more local action in terms of its mitigation (Angel et al. 1998, Betsill 2001, Betsill, Bulkeley 2006, Brown, Purcell 2005, Bulkeley 2000, Deangelo, Harvey 1998, Easterling et al. 1998). In this discursive process, the 'city'/ 'urban'/ 'local' is contrasted with the 'national' and the 'global' scales in terms of their respective willingness and ability to take effective action on climate change.

Stakeholders and analysts have produced various reasons why there should be a shift in focus to the 'city'/ 'urban'/ 'local' scale as the domain of the response to anthropogenic climate change (Deangelo, Harvey 1998, Angel et al. 1998, Flynn 2000, Bulkeley, Kern 2006, Rutland, Aylett 2008, Kates et al. 1998, Senbel, Fergusson & Stevens 2013, Wang 2013). It is argued that

the world's cities are the source and the solution to the problem of global climate change, given that they have become the habitat of most of the world's population (C40, 2017; Rosenzweig, Solecki, Hammer, & Mehrotra, 2010). In terms of being the source of the problem, it is argued that urban energy consumption – residential, industrial, commercial and transportation – produce approximately 70% of global GHG emissions (UN-HABITAT, 2011). 'Cities' are seen as centers of innovation and wealth, and, for that matter, are well equipped to take action on climate change (Rosenzweig et al., 2010).

The material scale practice of climate protection is often based on the "geographical-institutional arrangements" (Swyngedouw 2004: 26) around the nation-state (national scale). Schreurs (2008), in her analysis of sub-national climate practices, for instance, makes references to the Federal state of Germany, and the state of California as local scales in the context of their respective existence as sub-governments of the European Union and the Federal State of United States respectively. The adoption of the state tiers of scale in the practice of climate change governance is evident in the increasing innovation of climate change policies by municipal governments and the formation of Trans-National Municipal Networks (TMN) to promote and facilitate their efforts. In municipal climate protection efforts, there is recognition by actors that the locality exists in the context of other sales; which is taken into consideration in the development and subsequent implementation of the climate protection plans. The areas of action and the types of policy instruments that are deployed in the climate protection plans are informed by this recognition of scale. Local governments assess their windows of opportunity, particularly, in terms of their various jurisdictional capacities to tackle various areas of climate protection relative to other scales, such as the national scale (Federal government). Even in situations where, by the estimation of actors, certain phenomena are deemed to be important to

their climate protection efforts but are in the domain of other scales, they devise various measures such as policy advocacy and partnerships, to circumvent the existing barriers to influence such phenomena.

The discursive and material scale practices are not necessarily mutually exclusive; they sometimes mirror each other. The discursive local, city, urban, national and global, in climate change mitigation, have often been extrapolated materially to the various tiers of state authority. For instance, the discursive notion that climate change is a global problem and therefore requires a global solution is concretize using the international relations logic that 'regimes' of cooperating nation-states are the most feasible approach to solving problems that are global in nature; hence, the establishment of the United Nations Framework Convention on Climate Change (UNFCCC). The "Rio Earth Summit" in 1992, and the subsequent annual meetings of parties, also termed Conference of Parties (COP), is then to serve as the avenue for negotiating the conduct of the 'regime' (Zia, 2013). The outcome of the 'global' scaling of global climate change governance has been the action or inaction of national governments in enacting policies either through legislative or executive decision to meet their commitment to the 'regime'.

In addition, the entwined nature of the discursive and material scale practices, also betrays their distinction. Emerging researches have revealed that while the bureaucratic tiers of the state and their unavoidable interaction is pivotal to initiating climate change action (material scaling), they are short of the promise often touted by the discursive deployment of the 'global', 'national', 'local', 'city', 'urban' etc. as the curative platforms of global climate change. For instance, local governments are only always able to take action in certain core policy area such as renewable energy target setting, energy efficiency incentive programs, educational efforts, green local government procurement standards, public transportation policies, public-private

partnership agreements with local businesses and tree planting (Betsill & Bulkeley, 2007; Broto & Bulkeley, 2013; Schreurs, 2008).

Through a critical examination of the contributions from agriculture, deforestation, heavy industries, high energy consuming households and power plants in the outlying rural area, to global GHG emissions, David Satterthwaite adds to the mismatch of the discursive and the material scale practices with the assertion that the assignment of 75-80% of global GHG emissions to cities (in support of a shift in focus of climate action to the local scale) is an overestimation. He asserts that it is very likely that globally, cities' contribution to the accumulated GHGs is less than half of all anthropogenic GHG emissions (Satterthwaite, 2008). In a more recent study, which examined the contribution of TMNs to global climate change mitigation, it was concluded that the widely propagated assumption that subnational climate initiatives are better positioned to address global climate change compared to the global regime of cooperating nation-states (UNFCCC) may be an exaggeration. The findings revealed that TMNs tend to be focused on only cities in the global north; only a few networks commit to quantified emission reduction targets; and stringent monitoring mechanism are absent (Bansard, Pattberg, & Widerberg, 2017). In a nutshell, the discursive and material scale practices may not be mutually exclusive, but they also do not fit neatly into each other.

The overarching argument is that there is no organic or automatic scale out there where phenomena such as climate protection fit, but what constitutes a give scale is defined by the actors in a given situation through their practices. The political economy inspired notion of the urban scale or the local scale, for instance, may be more extensive than the boundaries of the municipality, but that is because the assigned underlying force defining the scale is based on the dynamics of the capitalist production system; hence, its boundaries may be defined by the extent

of the local labor market. In the case of the climate mitigation efforts the local scale is predominantly based on the adoption of policy by the local state tier of scale. Scale is therefore not fixed, universal, neutral or the preserve of geography, but "the products of economic, political and social activities and relationships; as such, they are as changeable as those relationships themselves" (Smith, 1995: 60–61).

2.6 The Local Government System

Local governments are not only increasingly seen as the pivots of economic growth and development, but also, agents of services delivery to the citizenry. As a result, the functions and responsibilities of local governments are increasing (Steytler, 2005). Overall, several processes, such as compacts, charters, special acts, statutes, constitutional provisions, resolutions, ordinances, administrative rulings and court decisions have led to the institutionalization of local self-governance in various federal systems (Kemp, 2002a).

2.6.1 United States

The mention of local government usually brings to mind cities or municipalities; however, the United States has different types of local governments – cities, counties, towns, townships boroughs, villages, school districts and several special-purpose districts. The organization structure of these various units of local governments is not uniform across the country. Municipal governments are generally known for providing a variety of services to their populace. Municipal governments are organized into several departments based on their functions. Each department then becomes a provider of those services related to its functions (Kemp, 2002a).

While some departments are restricted to providing specific services such as the police and fire departments, other departments have a wider variety of services they provide; for

example, public works, health and human services. The type of departments as well as the services that municipalities provide is not uniform across the country; local specific circumstances may inform the type of services that will be provided (Kemp, 2002a). Also, functions performed by municipalities in some states may be assigned to county governments in other states. Special districts may be created in some instance to provide certain services such as public transit, water treatment and school boards. Some municipalities may contract services from other municipalities, counties or private businesses. Each department may have a number of programs running in the process of providing the services related to their function. The number of programs vary from department to department as well as from locality to locality (Kemp, 2002a).

As of the first census in 1770, 97% of America was rural; hence, city government had not taken shape yet (Adrian, 2002). The form of city government in the United States has its roots from England. Cities at the time existed as Public Corporations with special charters granted to them by the governor or proprietor who represented the crown. The attainment of independence transferred decisions about municipal government from London to the emergent state capitals, and from the governors to the state legislature. However, moves were quickly made to minimalize the power of the state legislature over local government; for instance, the new constitution of the state of Massachusetts made it illegal for the legislature to impose a municipal charter on a town without its consent (Adrian, 2002).

The first 100 years of city and county government after independence was characterized by efforts to configure local government responsibilities and functions (Frisby, 2002). There was the need to not only ensure the existence of checks and balances in local government, but also, that policies and services where overseen by competent officials. This struggle led to the

introduction of three forms of local government – mayor-council, manager-council and commission. Although these forms of government have retained their form since their inception, the manager's role over the years has been shaped by social and economic dynamics (Frisby, 2002).

Local governments derive their power to govern from their respective state constitutions, statues, or the grant of charter by the legislature. Overall, the powers of the municipal government and its officials are conferred and curtailed by federal, state and local laws; and various court decisions (Kemp, 2002b). The municipalities are granted the power to create an official government in the form of boards or councils. The members of the governing body are elected by constituents of the municipal boundaries. The municipal government is imbued with the power to pass ordinances or local laws; these laws, however, may not be in conflict with state or federal laws.

In some states, municipalities are granted what is called home rule in the state constitution and state statutes. The city of St. Louis was the first to be granted home rule in 1875 from the newly created constitution of Missouri. The Missouri home-rule provision (1875) mandates state legislature to create a sphere called "municipal affairs" within which municipalities have the freedom to initiate and implement their own policies. It also protects the actions of municipalities within the "municipal affairs" sphere from review by the state legislature (Libonati, 2005). The home rule gives greater autonomy to municipalities to govern their own affairs with no interference from the state government. It enables municipalities to act on issues of immediate concern since no approval is needed from the state legislature for its actions. Although the home rule gives municipality the freedom with greater independence,

under no circumstance should the municipality enact laws that would evade state laws (Kemp, 2002b).

A major judicial prescription of local government that has generated a lot of debate is what has become popularly known as Dillon's Rule. "Local governments have only those powers expressly granted by state legislatures, those powers implied by the powers expressly granted, and those powers essential to the accomplishment of local government objectives"(Michelman & Sandalow, 1970). Under the Dillon's Rule, two important constraints can be observed. First, local governments are considered as creatures of the state hence, their everyday tasks are assigned to them by the state government. Second, local governments per this rule are expected to follow the law to the letter. The courts have been ruthless with local governments that have bent the rule; as a result, it has come to stand as the definition of local government power (Libonati, 2005). Also, local governments under Dillon's Rule cannot be said to have immunity because their actions in diverse areas (education, zoning and sewage among others) can be reviewed, amended, and completely reversed by the state courts (Libonati, 2005).

2.6.2 Germany

The Federal Republic of Germany operates a bicameral legislature. The second chamber of the house, known as the Bundesrat, which houses representatives from of the länder (similar to states in the in the US) governments serves a dual purpose (Parker, 2014). The Federal Republic of Germany has a total of 16 länder which includes the three city states of Berlin, Bremen and Hamburg. Currently, Germany's population stands about 82 million and the surface area is about 357,000 km². The Länder vary considerably in size: Bremen, which is made up of the cities of Bremen and Bremerhaven has a population of 680,000 people, while North Rhine-Westphalia, the largest, Länd is inhabited by about 17.9 million people. The number of

municipalities currently stand at 12, 477, a decrease from 16, 127 due to a process of consolidation between 1995 and 2004(Parker, 2014). On the average, each municipality is inhabited by about 6,572 people. Majority of the municipalities are small with about 37% of them with less than 1,000 people (Parker, 2014).

The 1949 constitution of Germany, the Basic Law, guarantees local self-governance in a democratic manner. According to the constitutional provision, the municipality (Kommunen) "shall be guaranteed the right to manage all the affairs of the local community on their own responsibility within the limits set by law. … The right to self-government shall include responsibility for financial matters. The local governments have the power to levy trade taxes according to the rates for assessment determined by them" (Kramer, 2005, p. 84). As self-governance is guaranteed in the Basic Law, there is a provision for local government in the constitution of the Länder can only further solidify rather than diminish this guarantee (Kramer, 2005). Except for a few cases, the powers of local government are not further elaborated upon in the Länder constitution. The Bavarian constitution is one of such cases; 16 areas have been listed as the domain of local governments (Kramer, 2005).

What is referred to as local government in Germany are districts (Kreise) and municipalities (Gemeinden) (Kramer, 2005). Districts are made up of groups of municipalities that pool their resources together to effectively deliver certain services to their inhabitants. Some of the services include water supply and social welfare. Districts may also be given the mandate by the Länder to supervise the activities of the municipality on their behalf. The districts derived their powers from Länd legislation and devolution from Länd and municipalities. In some cases, districts may be seen as overtaking municipalities in terms of functions and responsibilities due to their delegated power from Länder and their relative financial wherewithal. Some large cities

(approximately about 100,000 people) are districts in themselves are often referred to as district-free cities (Kramer, 2005). The freedom of association of municipalities is also guaranteed by the German Basic Law. This means that municipalities have the right to group based on function rather than spatially as in the case of districts.

There are two main dimensions of local self-government: administrative and functional. The administrative aspect has to do with the power of the municipality to manage, appoint staff, enact by-laws, administer its own finances, and carry out zoning and planning. These powers are not enabled by Länd legislation but, are enshrined in the Basic Law. Other powers, however, are provided by Länd laws (Kramer, 2005). Local government functions and duties are not only determined by the Basic law but by the Länd constitution as well. While some of these functions can be categorized as compulsory others could be considered as voluntary.

2.7 Conclusion

Through a review of some of the empirical cases of the 'politics of scale' literature, I have argued that geographic scale should be conceptualized as an analysis of scale practice. The idea is that actors in a given political struggle deploy the notion of scale in the pursuit of their desired goals. The analyst of a given phenomenon should be more concern about how scale is invoked by actors as part of the process of addressing the given issue; I refer to this exercise as an analysis of scale practice. Scale practice can therefore be discursive – like making a claim for something as global, local etc. without any concrete definition of the spatial limits or boundaries of these scales except their presumed existence and desirability or suitability for a given phenomenon to be posited. The paper interprets Howitt's examination of Aboriginal people's employment in the mining industry in Australia, as an example of such discursive scale practice. Scale practice can also be material – inheriting some already constructed scalar structuration

such as the administrative tiers of the state, which may include some additions to the layers either below above or in-between; in this case, the given phenomena are organized at these material scales with indefinable spatial boundaries and limits. Miller's study of the peace movement in Cambridge Massachusetts is an example of material scale practice. Also, a material scale practice can be in the form of institutional arrangements put in place to manage given processes (such as labor relations), as demonstrated in Herod's analysis of labor relations in the United during the New Deal Era.

However, discursive and material scale practices are not always mutually exclusive. Sometimes, it is a certain existing material scale practices that forms the basis of the discursive scale practice, or a discursive scale practices may lead to an extrapolation to an already existing material scale practice; this has played out in the politics of climate change governance.

3 Climate Change Politics and Policy in the United States

3.1 Introduction: Moral Politics

There is the general presumption that individuals and groups often consider the merits of a given policy before deciding on whether to support it or not (Tatalovich, Daynes, & Lowi, 2014). So, the potential material benefits of a policy are what would attract participation. However, some types of policies have been identified to defy the above logic; people may oppose or defend policies based on their moral beliefs. Some of the commonly discussed issues that generate moral politics include, abortion, LGBTQ, gambling, the death penalty, gun control, animals' rights, pornography, physician-assisted suicide and sex education (Tatalovich et al., 2014). On all these issues, individuals often invoke religious and other ideological believes rather than material benefits to support their stands. The enactment of laws to prohibit or regulate the consumption of alcoholic beverages; whether gay rights or abortion will gain political support; or legislation allowing gambling will pass in a given political setting; can be predicted using religious variables. According to Mooney, morality policy is grounded in political debates over "first principles" where at least one side of the controversy, or both, portrays the issue in moral terms and uses moral arguments (Mooney, 2000). Lowi (2010) in his foreword in Raymond & Daynes (2010) chose to describe the types of politics that are generated by these types of policies as radical politics and argues that even mainstream policies can be radicalized. With radical politics, political issue turns into to moral stand-offs, claims are turned into rights, legislation turns into litigation and all sources of stalemate (Lowi, 2010).

Raymond & Daynes (2010) added climate change as one of the issues that generate moral politics; perhaps an example of mainstream issue that has been radicalized. They argue that given that the benefits of a healthy climate are not exclusive to only certain individuals, any

one championing climate change mitigation policy will be doing so for altruistic reason. Although the issue of climate change cannot be reduced to the simple moral question of right or wrong, and answered based on one's underlying religious believes, its politics tend to emerge from the two dominant ideological stands that the various moralities have come to occupy in American politics – the conservative versus liberal moral divide.

From the outset, climate change policy in the United States has been radicalized and depicted by the conservative movement as a threat to American liberal democracy. They have often condemned the idea of climate change, calling it a hoax using dramatic rhetoric rather than scientific facts. The chapter, therefore, argues that the decision of pioneering local governments to act on climate change was predicated on the dual ideological worldviews displayed in national politics, rather than rationally though out material benefits or costs of taking action to the given locality. I take the pluralist position that power is diffuse and decision makers take into serious consideration the community-wide appeal of issues before acting upon them.

3.2 U. S. Climate Change Policy and Politics

The US has been a pioneer in scientific research on climate change; however, it has not been similarly proactive in formulating and implementing policies to respond to the scientific understanding generated. This is largely because climate change politics in the united states from the outset has been radicalized; taking the lines of conservative versus liberal politics. Roger Pielke Jr., in his two-part paper which reviews the policy history of the US Global Change Research Program between 1989 and 2000, blames the science-policy gap on the initial structuring of the overall US Global Change Research Program: "Because the program was structured to develop a predictive understanding of the earth's climate, and not to provide recommendations on action programs" (Pielke, 2000a). The assertion is that at the time the

scientific enquiry on climate change was complete, the policy dimension was lacking due to the separation of science and policy at the inception of the Global Change Research Program.

President Jimmy Carter was the first American president to address the issue of global climate change (Sussman, 2009; Sussman & Daynes, 2013). The president formed a collaborative study that brought together the Council on Environmental Quality, the Department of State, the Environmental Protection Agency (EPA), the National Science Foundation (NSF) and the National Ocean and Atmospheric Administration (NOAA) in 1977 to examine the changes in global population, natural resources and the environment (Sussman & Daynes, 2013). The report – Global 2000 Report – from this collaborative work hinted that the release of carbon dioxide into the atmosphere through human activity, could be affecting the world's climate (Council on Environmental Quality (US) & Barney, 1980). Through the National Climate Program, established by Public Law 95-367 in September 1978, the State Department, NASA, the NSF and NOAA were then tasked with conducting rigorous research to bring clarity in terms of the causes and impacts of climate change; these organization were, at the same time, also carrying out their individual scientific researches on the subject (Pielke, 2000a).

The increasing scientific knowledge generated by the National Climate Program, coupled with congressional hearings on climate change begun to generate policy interests. The first congressional testimony was by NASA scientist, Robert Watson, in June 1986 (Pielke, 2000a). Watson asserted that global climate change was "inevitable" and that it was only the timing and magnitude of impact that were left to be determined. Although the media frenzy around his testimony did not last long, the interest of many policymakers was aroused (Pielke, 2000a). In March 1987, an interagency committee known as the Committee on Earth Sciences chaired by NOAA scientist Anthony Calio was put together by the executive with the task of producing

knowledge about the Earth's system that could be easily utilized by policy makers (Pielke, 2000a).

The increasing congressional interest in climate change policy led to the Global Climate Protection Act of 1987 (Pielke, 2000a). President Regan signed the act into law, which essentially gave the EPA and the State Department the mandate to develop climate change policy. It is observed that this was a major tactic employed by the Regan and Bush administrations; to formally accept legislation but oppose any efforts to put them in practice (Pielke, 2000a). The Regan administration therefore effectively frustrated the efforts of the legislature to collaborate with the agencies to come up with policy responses to climate change (Pielke, 2000a).

It was towards the end of the Regan administration that the issue of climate change began to appeal to the general public, following NASA scientist, James Hansen's June 1988 testimony in the United State Senate. Relying on his own research and those of other scientists and scientific institutions, Dr. Hansen asserted that he was "99% certain" that global temperatures where rising due to anthropogenic forces (Pielke, 2000a; Pielke, 2000b). The same summer, United States experience a very hot summer with a severe drought in the Midwest; the largest forest fires on record occurred in Yellowstone and; the most powerful hurricane of the century – Gilbert – hit the northeast coast of Mexico (Pielke, 2000a). These events brought the issue of climate change to the public limelight, making it an issue in the 1988 presidential election, where President George H. W. Bush in his campaign declared "that he will counter the greenhouse effect with the White House effect" (Pielke, 2000a).

Just like his predecessor, President Bush sought to limit climate change policy to the domain of the White House. At the World Climate Conference in Geneva in 1990, President

Bush refused to sign the carbon dioxide emission agreement: making the US the only developed country to refuse to sign the agreement (Vig & Kraft, 1996). Again, at the UN earth Summit in Rio de Janeiro, when the UNFCCC was presented for ratification, the President only agreed to ratify the convention when the terms were change from mandatory to voluntary commitment (Pielke, 2000a). The Bush administration upheld the conservative economic ethic that puts the economy ahead of everything else. On November 16, 1990, President George W. H. Bush signed the Global Change Research Act of 1990 into law (Pielke Jr, 1995; Pielke, 2000a; Pielke, 2000b). This new law, which led to the establishment of the Global Change Research Program, was meant to add the task of producing "usable information on which to base policy decisions relating to global change" to the task of the Committee on Earth Science which had begun in 1987(Pielke, 2000a; Pielke, 2000b). Although the legislative requirement was that the program produces 'usable information', what was meant by 'usable information' became a subjective issue (Pielke, 2000a; Pielke, 2000b).

When the democratic party won the 1992 presidential election, after the White House had been occupied by the republicans for the past twelve years, the environmental movement viewed it as the opening of a policy window for climate action (McCright & Dunlap, 2003). However, the different sections of the American conservative movement were mobilized, and effectively used the "Republican Revolution" (republican party claimed the majority in the two chambers of congress in the 1994 midterm elections) to carry out a massive assault on climate change policy. Their activities sought to undermine the scientific authenticity of climate change so as to prevent regulatory action. The agents of this anti-climate change movement were the conservative think tanks, politicians (republican members of congress) and the fossil fuel industries and their business allies (McCright & Dunlap, 2003).

The legitimacy of climate change as a social problem needing policy attention was vehemently challenged. As a result, leading up to the Kyoto Protocol, the environmental movement failed to mobilize a national consensus on the reality of climate change. It was therefore not surprising that the US ratification of the Kyoto Protocol was dead on arrival, given that the Senate passed, by a vote of 95 to 0, the Hagel-Byrd Resolution on July 25, 1997, that made it clear to the Clinton ddministration that it was in no position to ratify any agreement that would be detrimental to the US economy or would not have similar requirements for developing countries. The Protocol lay lifeless in the remainder of the Clinton administration and was finally interred when President George W. Bush's announced in March 2001 that the US had no intention of committing to the Kyoto Protocol.

The Bush ddministration created fertile grounds for vicious attacks on the scientific legitimacy of climate change by the conservative movement. The administration itself has been accused of employing a wide range of practices, described as "abusing science" – suppressing and, in some cases, dismissing federal scientist; doctoring or hiding scientific findings for government reports; manipulating the government's science advisory system; and distorting scientific findings and selecting favorable scientific findings – to prevent any form of action on climate change (McCright & Dunlap, 2010). The New York times revealed that Philip Cooney, the White House Chief of Staff on Environmental Quality, between 2001 and 2005, edited the EPA's annual air pollution report and, in June 2003, edited the EPA's draft version of its 'State of the Environment' report (McCright & Dunlap, 2010; Sussman & Daynes, 2013). It was later revealed that the EPA had to drop the climate change section of the report because the edits seriously contradicted the mainstream science of climate change (McCright & Dunlap, 2010). The accusation later led to Cooney's resignation as the White House Chief of Staff on

Environmental Quality (Sussman & Daynes, 2013). In September 2006, the officials of the Bush administration in the Department of Commence blocked a NOAA report on the relationship between global warming and increased intensity of hurricane, from being published.

During the 2008 presidential campaign, then democratic candidate, Barak Obama, promised a "new chapter in America's leadership on climate change". Unlike his predecessor, President Obama had a positive attitude towards climate change and made it an issue of national interest (Sussman & Daynes, 2013). His first action on climate change was when he announced on March 28, 2009 that he was going to launch an economic forum, which will bring together delegates from the major global economies to discuss climate change. After the forum in July 2009 in Italy, President Obama declared that all the major economies had agreed to heed the scientific projections of climate change, although no specific mitigation targets were set (Sussman & Daynes, 2013).

In February 2009, the Obama administration tried to introduce the cap and trade system to control greenhouse gas emissions; however, the bill failed in the Senate after going through the House. republican senator, Lindsey Graham remarked as follows "Realistically, the cap-and-trade bills in the House and Senate are going nowhere…. They are not business-friendly enough, and they don't lead to meaningful energy independence" (Sussman & Daynes, 2013). Sensing that it was going to be difficult to achieve any climate change legislation through congress, the president decided to revise his strategy by relying on his own presidential powers and changing the rhetoric from climate change legislation to clean energy legislation. The Department of Energy's (DOE's) Energy Efficiency and Conservation Block Grant (EECBG) Program for cities, communities, states, U.S. territories, and Indian tribes to carryout energy efficiency and

conservation programs, which was part of the stimulus package of the American Recovery and Reinvestment Act (Recovery Act) was one such strategies.

One of his first initiatives using his presidential authority was when he signed a memorandum on improving the standards of the vehicle fuel economy (Sussman & Daynes, 2013). On May 19, 2009 in collaboration with the state regulators (CARB), and the auto industry, the Obama administration implemented the first fuel efficiency standards for vehicles for the sole purpose of climate protection. Phase I of the National Program, finalized in April 2010, was for the NHTSA to set fuel efficiency standards which target a new vehicle average of 34.1 miles per gallon in MY2016. President Obama announced plans in May 2010 to extend the program with a second phase covering new light-duty vehicles sold in MY2017-2025. The expected GHG emissions from the Obama-era CAFE standards was 6 billion metric tons of carbon. Obama also issued an executive order that instructed the National Economic Council and the Domestic Policy Council to create a position of assistant to the president for energy and climate change – Carol Browner, a renowned environmentalist was the first occupant of the position (Sussman & Daynes, 2013).

The Obama climate change actions were matched by anti-climate change propaganda and action, largely from the conservative media and think thanks, and Tea Party branch of the republican party. On November 23, 2009, Rush Limbaugh an American entertainer and radio talk show host put his position against climate change theatrically as follows:

> Now, the bottom line is, the whole man-made global warming movement is a fraud. It is a hoax. Its made-up lies. I have known this since the beginning of the movement. I am the one who said that militant environmentalism is the home of displaced communists after the Berlin wall came down. Now, scientists cannot rely on common sense. So, the anti-global warmers have to go out there and get their own science to counter the science that the pro-global warming crowd is using, and they are making it up. (Sussman, and Daynes 2013, p.11)

The Tea Party movement particularly expended their efforts in attacking climate change to local sustainability and climate protection efforts. They associated such efforts with the United Nations Agenda 21, which they described is a globalist agenda that was detrimental to the conservative ideals of personal liberty and private property ownership (Carey, 2012). “Agenda 21 is an elusive enemy that floats in and chokes you gradually,”. They want to destroy the middle-class way of life,” Tea Party activist Judd Saul of the Cedar Valley Falls, Iowa said. In a Tea Party meeting in in Murfreesboro, Tennessee, in April 2012, Jake Robinson told Tea Party members “Agenda 21 aims to undermine your property rights and force you to live in cities”(Carey, 2012). Joe Dugan, leader of the Myrtle Beach Tea Party in South Carolina, went as far as describing Agenda 21 as "nothing short of treason” (Carey, 2012) . This campaign was able to stick with some conservatives who believed that the Local Agenda 21 was a global grand scheme to take away their gun rights, eradicate suburban life and convert America to communism.

At the time of the Tea Party attack on climate change and Local Agenda 21, ICLEI was the dominant transnational municipal network helping localities with their sustainability and climate protection efforts; hence, ICLEI was made synonymous with Agenda 21 by the Tea Party anti-climate change activists. Their Attacks on ICLEI resulted in the loss of some U.S members. Some cities that had committed to climate protection through their membership to ICLEI’s CPP yielded to the pressure of the Tea Party and only limited their climate mitigation efforts to city operations instead of the entire community.

States such as Alabama, Kansas and New Hampshire also passed laws in 2012 blocking any Agenda 21 related activities. The Republican National Committee in August 2012 stated: “We strongly reject the U.N. Agenda 21 as erosive of American sovereignty. “The Tea Party

activist acknowledged that not all their target population knew what the local Agenda 21 was all about, so they focused on specific programs such as the construction of bike lanes(Carey, 2012).

Consistent with the right-wing conservative ideology of preservation of private property and individualism, President Donald Trump even before declaring his intention to run for president, had taken a radical opposition to climate change. As of June 2017, Vox Media counted 115 climate change skepticism tweets by Donald Trump, dating as far back as 2011 (Mathews, 2017). His tweets have either sought to deny the reality of climate change by confusing weather with climate or argue that any action on climate change would unfairly put the United States at an economic disadvantage vis-à-vis its rivals. Below are screenshots of some of his Tweets.

Thus, there was already expectation that as soon as the Trump administration assumes office, it will begin rolling back Obama-era climate protection actions in particular and environmental regulation in general; and there was no disappointment in this regard. On January

24, 2017, President Trump issued several memoranda aiming to hasten permitting for the Dakota Access and Keystone XL oil; January 25, 2017 news broke that the Trump administration had removed all references to climate change from the White House's website; February 1, 2017 the U.S. Senate confirms ExxonMobil CEO Rex Tillerson as secretary of state; February 17, 2017, the U.S. Senate confirms Scott Pruitt, a consistent litigant of the EPA over environmental regulations, as the head of the U.S. EPA – he would latter resign, in a little over a year, due to many ethical indiscretions, of course, unrelated to the assault of his deregulatory policies on the environment.

One of the first major causalities of climate change by the Trump administration was the Corporate Average Fuel Economy (CAFE) standards. After an earlier announcement on March 15, 2017 by the EPA Administrator Scott Pruitt and U.S. Secretary of Transportation Elaine Chao, that the Obama-era CAFE standards were going to be revised, on August 2, 2018 the Trump administration announced that it was going to proceed to keep the fuel efficiency standards at the 2016 requirement instead of the projections that had been made for the 2020-2225 models. The DOT and EPA under the Trump administration cited passenger safety as the reason for rolling back the Obama fuel efficiency requirements. They argued that fuel efficiency encourages more driving, thereby increasing drivers' risks of getting into accidents. The second safety reason was that the more fuel efficient a car is, the less motivation there is for owners to upgrade their cars, hence missing out on new safety technology on newer models.

The EPA administrator Scott Pruitt, in an interview on 'Fox and Friends' on April 14, 2017 said he personally opposed the international accord agreed in Paris in 2015, describing it as "a bad deal for America,". Just days after attending the G7 Summit in Italy, President Donald J. Trump stood before the press in the White House rose garden on Thursday June 1, 2017 and

said; “In order to fulfil my solemn duty to the United States and its citizens, the US will withdraw from the Paris climate accord, but begin negotiations to re-enter either the Paris accords or a really entirely new transaction, on terms that are fair to the United States,”. The president described the non-binding accord as punitive to the United States while rewarding other large GHG emitters. “The fact that the Paris deal hamstrings the United States while empowering some of the world’s top polluting countries should expel any doubt as to why foreign lobbyists should wish to keep our beautiful country tied up and bound down”. He added: “I was elected to represent the citizens of Pittsburgh, not Paris.”

Again, invoking the notion that climate change action is to the service of some external rather than American interest, on December 18, 2017 President Donald Trump announced that the United States will no longer regard climate change by name as a national security threat. The President stated; “Our government's first duty is to its people, to our citizens—to serve their needs, to ensure their safety, to preserve their rights, and to defend their value.” In 2015 the Obama administration described climate change as “an urgent and growing threat to our national security,”

Under the Trump administration, there have been reports of deletion of climate change content from the websites of state institutions such as the Interior Department and the EPA. There is effort to undo the Clean Power Plan of the Obama administration. The EPA Administrator, Scott Pruitt, announcing in October 9, 2017 the administration decision to eliminate the Clean Power Plan (CPP), declared that “the war on coal is over.” The CPP was established in 2015 to get power sector to shift away from coal fired plants towards renewable energy sources(Greshko, Parker, Howard, & Stone, 2018).

On January 31, 2018 The Washington Post reported that in its 2019 budget, the Trump administration is seeking to slash Department of Energy funding for renewable energy and energy efficiency initiatives by 72 percent. In its FY2019 budget and addendum, the Trump administration has proposed sweeping rollbacks to U.S. programs designed to study and mitigate the effects of climate change, as well as cuts to research on renewable energy (Greshko et al., 2018). As it did in 2017, the Trump administration has proposed axing several NASA Earth-science missions, including PACE and OCO-3. The Trump administration's 2019 budget also advocates for a 55-percent cut in spending on the Department of Energy's applied R&D programs. On May 9, 2018 Science magazine reported that the Trump administration has ended NASA's Carbon Monitoring System, a $10-million-per-year effort to fund pilot programs intended to improve the monitoring of global carbon emissions (Greshko et al., 2018).

From the above discussion, the material characteristics of climate change have been clouded by discursive partisanship, predominantly from the ideologically conservative in American politics.

3.3 Rational Choice Approach to Policy Innovation

Policy innovation in simple terms is the propensity of a jurisdiction to adopt a new policy that already exists in some form in another jurisdiction. Two strands of explanatory variables for policy adoption have persisted since the emergence of the systematic study of policy innovation: Internal determinants – political, economic and social characteristics of the political system – and diffusion – intergovernmental relations and effects.

Zahran, Grover, Brody, & Vedlitz (2008) in their paper on local climate policy innovation, start of by making the point that with the aid of climate models, the expected impacts

of global climate change have been noticed to vary geographically due to different ecological social and economic conditions (Zahran, Grover, Brody, & Vedlitz, 2008). Coastal regions, for instance, are expected to be impacted by sea level rise. In the United states also, different regions are expected to be impacted differently by climate change and, they argue that, this may go into influencing local governments' decision to participate in climate mitigation activities. On the other hand, it is argued that climate mitigation efforts are likely to be costly to local economies given that a reduction in GHG emissions may require less use of energy, which could be negative to the industrial sector. So, whereas the benefits that may accrue to climate mitigation efforts will be disproportionately high for coastal communities, it may be detrimental to industry heavy local areas. Based on this logic, their research relied on variables derived from theories of public good to ascertain the rationale behind local governments' adoption of climate protection policies. Their assumption is that local governments are rational entities and their decision to adopt policies towards climate change mitigation will be influenced by a careful assessment of their risks to the impacts of climate change and costs of acting.

They further argue that the Metropolitan Statistical Areas (MSA) account for about 78% of the global CO2 emissions and, the factors that may influence action – the impacts, stressors, and civic capacity, are regional. They therefore regard the MSA as the most appropriate jurisdiction for the analyses of local climate policy innovation. So, basically, their underlying assumption was that it is the internal characteristics of the MSA that determines a local jurisdiction's decision to participate in local climate action, in this case ICLEI's CPP campaign.

With regard to climate change risks, the variables that were considered included, precipitation above normal, natural hazard casualties in terms of numbers of injuries and fatalities, percent of metropolitan area within the EPA-defined at-risk coastal lands – areas below

3.5 meters above sea level, and the amount of eco-sensitive areas in the metropolitan area such as wetlands and forests. The climate stressors that were viewed as influencing innovation were, population density, carbon employment, travel behavior, and solar energy use. Finally, environmental course involvement, income, college education, and environmental groups were the civic capacity variables taken into consideration.

The individual indicators under the three main variables were organized into three statistically reliable indices by averaging their respective z-scores. A positive correlation was observed between localities' involvement in CCP campaign and all the climate risks, as well as, the civic capacity variables. Also, as expected, high climate stressors were found to negatively correlate with CCP campaign. Their conclusion was that climate change risks, activities that stress the climate system and civic capacity determined the propensity of a locality's adoption of climate protection policy.

First, the use of the internal characteristics of the MSA as the determining factors of local climate policy innovation downplays the importance of the political agency of the individual localities. In fact, one of the fundamental determinants of policy innovation is policy makers' estimation of the electoral consequences of their decisions (Arnold, 1992). Politicians are more likely to adopt a policy if it would result in electoral fortunes and elections are not decided at the MSA level. Also, there is an unjustifiable over reliance on the putative rationality of the jurisdiction in the selection of the variables. These assumptions have not been proven to derived from real practice. Climate change politics in the United States, since its inception, has not lent itself to the rational evaluation of the material benefits of policy adoption. The fact that their findings confirm their initial assumptions does not mean that the adoption of climate protection policy was based on a rational assessment of the material benefits of taking action. Berry and

Berry (1990) criticized the use of correlation and regression analysis to test policy innovation. Through simulations of these earlier methodologies for testing policy innovation, Berry brought to the fore that these methodologies were faulty, given that they confirmed the existence of regional diffusion, national interaction, or the effect of internal determinants in cases that they did not exist.

Another study by Krause (2011) uses the local governments' membership of the United States Mayor's Climate Protection Agreement (MCPA) to determine localities' probability of adopting local climate protection plans. She argues that the common practice is to look at actions as influenced by local factors without taking into consideration how state level actions could also be playing a role in such actions. She therefore applies a multi-level modelling method to ascertain the probability that a local government will adopt local initiatives to mitigate climate change. She categorized the data into level 1 and level 2. With level 1 being the municipalities and level 2, the 50 contiguous US states. A municipality's adoption of the U.S. Mayor's Climate Protection Agreement was the dependent variable (Krause, 2011).

The independent variables were then set for both state and municipal levels based on three sets of factors; resources, motivation and obstacles. The level 1 resource variables include population size, and per capita general revenue. This is based on the longstanding consensus in the literature that larger cities with a lot of resources are more likely to innovate new policies (Walker, 1969). The idea is that large cities with significant resources are the ones that can afford the administrative resources needed to develop, implement and maintain climate protection strategies (Betsill, 2001). Other level 1 resource variables were; ownership of energy utility and proximity to cities that already have climate protection plans. The study identified the level 1 motivation variables as median income, level of education, cities' civic engagement, the political

leaning of majority of the people in the municipality and the municipal form of government – Mayor-Council or Council-Manager. The argument is that the Mayor-Council type of governments breeds partisanship and credit taking, so there is more likelihood of initial policy adoption with this form of government. She added air quality to the list of independent motivation variable, arguing that studies have shown that climate policies are often based on local co-benefits – mitigating climate change and dealing with a local environmental issue at the same time. In terms of obstacles, cities with greater proportion of their local economy dependent on manufacturing are viewed as less likely to adopt climate mitigation.

Similarly, state level factors were categorized into resources, motivation and obstacle. The idea it that although state level climate protection efforts do not explicitly direct municipalities to take up climate protection initiatives, their presence is expected to either influence local governments to adopt or become reluctant in doing so. She used the multilevel modeling technique, to analyze the independent variables at the two levels simultaneously. The dependent variable is influenced by the individual variables of the municipality as well as the state level variables.

In terms of the level 1 motivation variables, the study found that localities with mayor-council form of government, high level of education and democratic political orientation had a high probability of joining the MCPA. It also found that large population, high level of per capita general revenue and horizontal diffusion – cities with many neighbors participating in climate protection – as enabling resources. The study however found a negative relationship between household income, and ownership of municipal electric utility (Krause, 2011) and the adoption climate protection. The conventional wisdom is that the demand for environmental protection increases with increasing prosperity or economic well-being (Rothenberg, 2002).

In the area of obstacles, her study found that the more a city is engaged in manufacturing the less likely it was to adopt climate protection. The argument is that the presence of strong manufacturing will lead to a lack of consensus on developing climate protection. The impacts of barrier variables, however, were found to have very little impact, although significant.

About the state level variables on the other hand, her study found no impact on the propensity of cities to adopt climate protection. In a nutshell, neither the presence of climate protection plan at the state nor the political, economic factors within the state had an impact on the local adoption of climate protection efforts. This finding is a strong support for local specific dynamics being responsible for local policy innovation, particularly climate protection (Krause, 2011).

Krause study is illuminating in the sense that in terms of the internal determinants variables she breaks them down into resources; motivation; and obstacles. In terms of motivation her study found the political orientation and level of education to be significant motivating factor – this is consistent with my argument that it is the prevailing moral politics around climate change that informed local governments LCAPs innovation. She also found that Mayor-Council form of municipal government had a significant influence on local governments' decision to innovate. It must however be noted that her dependent variable was local governments' membership to the U.S. Mayors Climate Protection Agreement. Given that mayors under the Mayor-Council type of government tend to have a lot of authority they can sign an agreement such as the MCPA without consulting their council members, which is less likely to be the case in other forms of governments such as the council-manager type. This factor likely produced the positive impact of municipal form of government on the adoption of LCAPs observed by Krause. A lot of local governments that join these transnational and national municipal networks for

climate protection do not proceed to develop and implement concrete protection policies; hence using memberships to these networks as policy innovation may be faulty. In a nutshell some mayors may sign these agreements just to cast themselves in a positive light among their peers while knowing that they do not have the pollical backing back home to take concrete action. No significant correlation was found with obstacles to innovation such as ownership of city utility, and the number of GHG producing jobs. These factors may be more important influencing efficacy of LCAPs rather than their initial innovation. In addition, as Berry and Berry have argued, these correlations may exist without necessarily being the driving force behind cities adoption of climate protection.

This dissertation argues that the single most important factor that influenced pioneering local governments' climate protection policy adoption was the prevailing politics – moral politics – around climate change.

4 Research Design and Methods

This section discusses the overall structure of the research and the methods employed to answer the research questions. The data, research participants and methods employed are discussed as well. It also delves into the epistemological, methodological, and political justification for each of the methods used.

4.1 Research Design

The main goal of this research was to examine local climate efforts, so as, to provide useful lessons for increasing the numbers of LCAPs innovation and improve the efficacy of the individual local action, towards the global goal of climate change mitigation. The study therefore had two core empirical areas: ascertaining the factors that influenced pioneering localities to adopt climate protection policies, particularly in the United State, and evaluating the capacities and efficacy of the LCAPs. The first core area combined critical policy theory, interviews with local climate action managers and Geographic Information Systems, using secondary survey data, to analyze the innovation of local climate action plans in the United States.

With the United States as one of the world's leading GHG emitters, but lagging in terms of mitigation efforts, and Germany also being the largest economy in Europe, but one of the leaders in climate change mitigation efforts, the study deemed it useful to examine cases from these two countries. The study sought to achieve variety, as well as detail; in that it sought to eventually develop best practices for local climate mitigation efforts globally. An in-depth study of municipal/county climate actions of plans in the United States and Germany was therefore deemed as the most feasible approach to answering the research questions. Five and 21 local governments in Germany and the United States respectively constituted the study.

The German cases were derived from the list of local governments that are signatories to the Covenant of Mayors. The Covenant of Mayors is a network of local and regional governments that was launched by the European Commission in 2008, to support the climate mitigation and renewable energy efforts of local authorities. Part of the commitment of signatories is to meet set GHG emissions reduction targets and take practical steps to meet them (Covenant of Mayors, 2017). Getting access to the English versions of the LCAPs online was one of the criteria for selecting the local governments to be studied. In some cases, the information about the signatory localities hosted on the Covenant of Mayors website contained the email addresses of the personnel in charge of their LCAP. In situations where such information was missing, a google search was conducted to find the contact person or department in charge of the given LCAP. Emails were eventually sent out to the contacts, introducing them to the research and requesting an interview with the personnel in charge of the locality's climate mitigation efforts. Based on the number of responses to the emails, and the workability of scheduling, the study gained access to five local governments in Germany for interviews about their climate protection efforts.

In selecting the cases to be studied in the United States, the ICMA 2010 Sustainability Survey was first imported into a geodatabase through ESRI's ArcCatalog and an attribute query was conducted to select the local governments that had answered affirmatively to establishing community-wide climate protection related actions – baseline GHG emissions for the community, GHG reduction targets for businesses, and GHG reduction targets for multi-family residence. Based on the list of local government from the query, an online search was conducted to find their respective LCAPs. It must be noted that there are local governments that sign up to climate agreements and even set GHG emissions reduction targets but do not proceed to develop

an action plan. Having a plan is therefore considered as one of the foremost significant steps towards climate protection.

The next step was to conduct another online search for the contact person or department that oversees the local governments climate protection efforts. Again, emails were sent out to the contacts found, introducing the research, and requesting a telephone interview on their climate protection efforts. Based on the responses from three rounds of emails sent to non-responding contacts, and scheduling workability, the study yielded 21 interviews with 21 local governments – three counties and 18 municipalities.

The methodological approach deemed feasible for this study was a mixed method approach. The study employed both quantitative and qualitative methods in seeking answers to the research questions. The quantitative analysis was quite basic; it was for the purpose of ascertaining the progress municipalities have made in terms of their GHG emissions reduction targets. The study however, relied heavily on qualitative interviews and content analysis for the most part; examining the capacities of the various localities' climate mitigation efforts.

Table 4.1
LCAPs Germany

Local Government	**State**	**Population**
Berlin	Berlin	3,470,000
Freiburg	Baden-Württemberg	222,203
Hamburg	Hamburg	1,763,000
Hanover	Lower Saxony	523,642
Heidelberg	Baden-Württemberg	154,715

Table 4.2

LCAPs United States

Local Government	County	State	Population	Form of Government
Alameda	Alameda County	CA	73,812	Council-Manager
Albemarle County	Albemarle County	VA	98,970	Executive
Austin	Travis County	TX	758,386	Council-Manager
Baltimore	Baltimore City	MD	621,115	Mayor-Council
Boulder	Boulder County	CO	97,468	Council-Manager
Burlington	Chittenden County	VT	42,417	Mayor-Council
Charlottesville	Charlottesville city	VA	43,435	Council-Manager
Cincinnati	Hamilton County	OH	296,950	Mayor-Council
Columbia	Richland County	SC	129,483	Council-Manager
Creve Coeur	St. Louis County	MO	17,833	Council-Manager
Durham	Durham County	NC	228,374	Council-Manager
Evanston	Cook County	IL	74,486	Council-Manager
Fort Collins	Larimer County	CO	144,073	Council-Manager
Hayward	Alameda County	CA	144,342	Council-Manager
Miami-Dade County	Miami-Dade County	FL	2,496,435	Commission
Mission	Johnson County	KS	9,323	Mayor-Council
Montgomery County	Montgomery County	MD	971,777	Executive
Mountain View	Santa Clara County	CA	74,056	Council-Manager
Portland	Multnomah County	CO	581,496	Commission
Roanoke	Roanoke City	VA	96,922	Council-Manager
Tacoma	Pierce County	WA	198,397	Council-Manager

4.2 Methods

The study used a mixed methods approach, employing GIS, content analysis, in-depth-interviews, and basic statistics. The GIS was used to analyze the innovation of local climate mitigation policy in the United States. The premise of this part of the study was that climate change politics in the United States from the outset has been radical. In other words, it has taken the dual ideological worldviews that have dominated American politics – liberalism versus conservatism. Using the 2010 International City/County Management Association (ICMA) sustainability survey data and the 2012 presidential election results, the study visually demonstrated, by way of maps, through GIS data manipulation, how local climate mitigation policy innovation is influenced by the prevailing radical/moral politics of climate change.

Most of the information about the action plans of the various localities such as goals (emissions reduction targets), strategies, and progress are contained in their policy documents, progress reports and websites; thus, content analysis was crucial to this study. Climate change mitigation effort is a continuous process; hence, content analysis affords the ability to examine such efforts through time. In the process of evaluating climate action plans, document analysis draws out how they have fared over the years in terms of meeting their set goals. Another reason why textual analysis was employed in this study is its ability to draw out deeper meaning from text. In other words, textual analysis pulls out the hidden motivation embedded in a text; it reveals information that would otherwise not have been obtained through other methods; say interviews. For instance, some interviewees were not very open in their responses to some of the interview questions due to the potential political implications of being a local government employee.

A significant part of the study relied on in-depth interviews with climate change or sustainability managers of the localities selected for the in-depth study. The goal of the in-depth study was to gain full insight into the unique intricacies of the various localities' climate protection efforts and, also, generate reliable, comparable qualitative data (Russel Bernard, 1988). Hence, a semi-structured interviewing style was deployed. Using open ended questions, this interviewing style prevents digression whiles generating conversational responses (Crang & Cook, 2007). Climate action managers had the freedom to express their unique, individual experiences, for instance, in terms of the spatial and temporal conditions that either enable or hamper their climate protection efforts. The initial examination of the climate action policy documents of the selected local governments enabled the development of relevant and meaningful semi-structured interview questions for the study. The individual stories and narratives of key officials of the programs were collected to ascertain the challenges and opportunities in the implementation process.

4.3 Data and Data Collection

4.3.1 Data for GIS Analysis

The data for the GIS analysis included ICMA 2010 Sustainability Survey; the county level 2012 United States presidential election results; and the U.S counties shapefile with FIPS codes. The ICMA 2010 Sustainability Survey was sent out to 8,569 local governments in the United States with a response rate of 25.4% (a total of 2,176 local governments). The survey contained 25 main questions. The main goal of this part of the dissertation was to examine the relationship between local governments' adoption of sustainability actions on the one hand, and their adoption of climate mitigation actions on the other, relative to their political orientation. The purpose was to assess the strength of the argument – through visual evidence – that the

politics of climate change has been largely radical/moral which in turn influenced local governments' adoption of climate mitigation policies. Questions 2 and 4 of the survey were therefore extracted for the study given that they border on local governments' adoption of sustainability and climate change mitigation actions respectively.

The county level U.S. presidential election results for 2012 was also used to derive the political ideological learning of local governments. The assumption is that a conservative leaning population will vote Republican while a liberal leaning population votes Democratic. The final dataset for the GIS analysis was the cartographic boundary shapefiles are named; gz_2010_us_050_00_rr.zip which shows county boundaries and contains their FIPS codes as well.

4.3.2 Documentary Data

The importance of documentary data sources such as policy documents, feasibility studies reports, progress reports and webpages, to this study cannot be over emphasized. One of the fundamental aspects of this research was the evaluation of the various climate mitigation efforts. However, before that could proceed, the specific goals of the various action plans needed to be identified. To establish consensus on the goals of the various LCAPs, the study first examined the policy documents of the individual mitigation action plans, taking note of their set targets, time line set for achieving the targets and the various sectors of the economy targeted as the areas of action. As a result, finding the policy document online was one of the main criteria in deciding which locality was to be part of the study. Some localities had one or more updates to their plans and each of those updates were accessed and analyzed. Most of the more ambitious localities either produced regular progress reports on their plans and the specific strategies implemented or updated their websites regularly with such information. For instance, most of the

latest GHG emissions inventories and emissions reduction achievements were accessed through these progress reports and webpages of the LCAPs.

4.3.3 In-depth Interview data

Another data set that was generated for the study was derived from in-depth qualitative interviews of 21 and five local climate action managers in the United States and Germany respectively. In addition, managers of the National Climate Initiative Program, a funding program for local action efforts in Germany, and the National Climate Action Plan of the federal government of Germany were interviewed. There were 28 interviews which lasted from between 30 minutes to about one hour 15 minutes long, resulting in a total of 22.8 hours of recorded audio. The transcripts of all the interviews amounted to about 530 double spaced pages. The interviews with the managers of the German National Climate Initiative and the National Climate Action Plans, together with one of the local governments (Heidelberg) were carried out in person at the offices of the personnel in Germany between November 2015 and December 2015. Due to scheduling problems, the interviews with the remaining three German local governments were done via telephone interviews between January 2016 and February 2018. The interviews with the 21 local climate action managers in the United States (18 municipalities and three counties) were conducted via telephone from December 2017 to March 2018.

5 Radical/Moral Politics and Local Climate Policy Innovation in the United States

5.1 Introduction

As it has become increasingly clear that the federal government in the United States cannot be relied upon for a steady incremental climate action, the role of the local government in this regard has become even more important. To improve the adoption of climate protection policies at the local level it is important to understand the prevailing conditions that influenced pioneering localities' innovation of climate mitigation policies. Public Policy scholarship has identified two strands of variables that can be used to analyze policy innovation – the propensity of a jurisdiction to adopt a new policy that already exists in some form in another jurisdiction. There are the *internal determinants* (political, economic and social characteristics of the political system) and *diffusion* (intergovernmental relations and effects) variables (Sabatier & Weible, 2014).

A few studies have already been carried out analyzing local climate policy innovation in the United States, mostly relying on quantitative measures of the internal determinants variables from a rational choice stand point (Krause, 2011; Krause, 2012; Zahran, Grover, Brody, & Vedlitz, 2008). Their overarching assumptions have been that cities susceptible to environmental vulnerability (level rise, increases in annual average temperature, high causalities from past environmental disasters are more likely to innovate) and those with high civic capacity (democratic electorates, memberships to civil society groups, high education) are more likely to adopt climate protection measures. On the other hand, localities with activities that are a stress on the environment, such as energy intensive industries, are less likely to adopt climate protection measures. They use local governments' membership to networks such as ICLEI's CPP and MCPA to approximate local governments' adoption of climate protection policy.

Conducting a spatial analysis of the climate policy innovation using ArcGIS and relying on responses from interviews with local climate managers of 21 local governments in the United States, this chapter argues that pioneering local governments'' decision to innovate climate change mitigation policy was driven by an estimation of the dominant ideological stands of their inhabitants rather any a rational assessment of the material impacts of taking action. This position is founded on the evidence that climate change politics in the United States, from the beginning, has taken the dual ideological standpoint, the so-called conservative versus liberal ideologies, that have consolidated in American politics, and mirrored at the polls as republican versus democratic.

5.2 GIS Analysis

This section used GIS data manipulation to visualize the relationship between LCAPs adoption and Political ideology by county using the ICMA's 2010 U.S. Sustainability Survey data set and the 2012 U.S county level presidential election results. The sustainability data was received in an excel file and uploaded into a file geodatabase in ArcGIS. Similarly, the 2012 county level election results were downloaded in an excel format and exported to the same file geodatabase in ArcGIS. Since the 2012 U.S county level election results did not come in a shapefile format to be displayed on a map, the election data set was joined to the counties shapefile using the their FIPs codes. In creating the various layers for the map display in ArcGIS, all the options to the sustainability questions were grouped to create the layer for sustainability actions; which means any local government that answered in the affirmative to any of the sustainability related options was deemed to be engaged in sustainability actions. With regard to the question specific to climate mitigation action, the options were related to either mitigation actions targeting local government operations and those targeting community-wide activities.

These actions were therefore grouped to form two layers – GHG reduction actions for local government and community-wide GHG reduction efforts. Given that the paper was interested in the broader adoption of climate protection by local governments, the community-wide GHG reduction layer is what was displayed on the map. The map was limited to the contiguous USA using the USA Contiguous Albers Equal Area Conic projection in ESRI's ArcMap 10.5.1. To symbolize counties by election results the percent of GOP Votes was used with the ranged on 50%-100% vote for GOP representing republican oriented counties and 0%- 50% of GOP votes representing democratic leaning counties. In terms of symbiology, the color ramp from red to blue was used, with blue representing democratic counties and red representing republican counties.

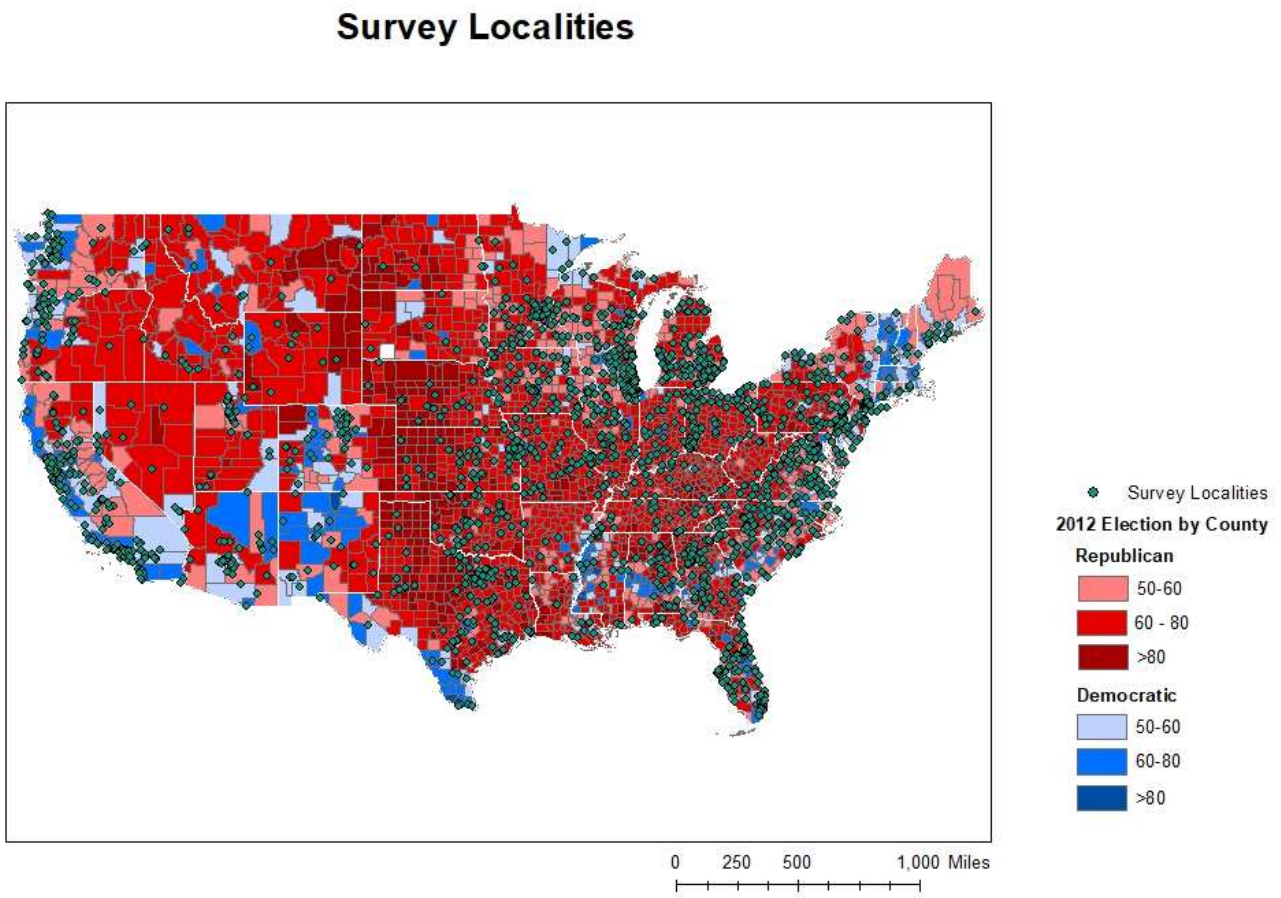
Survey Localities
Survey Localities
2012 Election by County
Republican
50-60
60 - 80
>80
Democratic
50-60
60-80
>80
0 250 500 1,000 Miles

Fig. 5.1

5.2.1 Results

For analysis, the results of the GIG data manipulation were organized into six maps. The first map (Fig. 5.1) displays the local governments that participated in the sustainability survey conducted by the ICMA. The distribution of participating localities across the country appears to be random and quite even with regard to political orientation. The appearance of clustering of cities is just a reflection of the population distribution across the country. The second map (Fig. 5.2) displays the local governments with sustainability and climate action plans. From a visual inspection of the distribution of local governments relative to political orientation, most of the localities with sustainability and climate mitigation efforts tend to be in blue counties, in other words, counties with majority of their population ideologically liberal. However, there is also a significant number of localities in red counties, in other words, ideologically conservative counties, that have sustainability actions. Although based on this observation, the assertion that localities with a conservative political orientation are less likely to adopt sustainability policies may be true, the notion of sustainability nevertheless resonates with a good number of conservative leaning localities as well.

The remaining four sets of two maps are placed on the same layout for the purpose of comparing the distribution of sustainability and climate change mitigation actions relative to political orientation. The maps are expanded to the four main regions of the United States – west, mid-west, south and northeast for easy visual inspection. The top map displays the localities with both sustainability and local climate mitigation plans and the bottom map displays the localities with only climate change mitigation actions. In the West (Fig. 5.3), there is no local government with climate protection action located in a red county, in other words, all the localities with climate protection action are localities that are predominantly liberal. In the mid-west (Fig. 5.4)

there is a count of about five localities in red counties however, out of this number only two are located in deep red counties while the remaining three are in the lightest red counties. Again, localities with climate mitigation actions are overwhelmingly in blue counties. The south (Fig. 5.5) too has a few climate mitigation action localities, about three, in red counties but they are all also located in the lightest red counties. Finally, the north-east (Fig. 5.6), just like the west has no locality with climate mitigation action located in a red county.

In a nutshell, whereas a good number of localities located in conservative counties have some form of sustainability action, it is very rare to find a conservative city with climate mitigation actions. This signals some level of receptiveness to the notion of sustainability in conservative learning localities as compared to the notion of climate change mitigation. It must be noted that this study is dealing with pioneering cities and so current data may now reveal more conservative localities having some climate protection actions. Perhaps the science and evidence of climate change are becoming compelling, hence rational decision making may be overriding ideological beliefs in climate change politics; this should be a matter of future research based on more recent survey data.

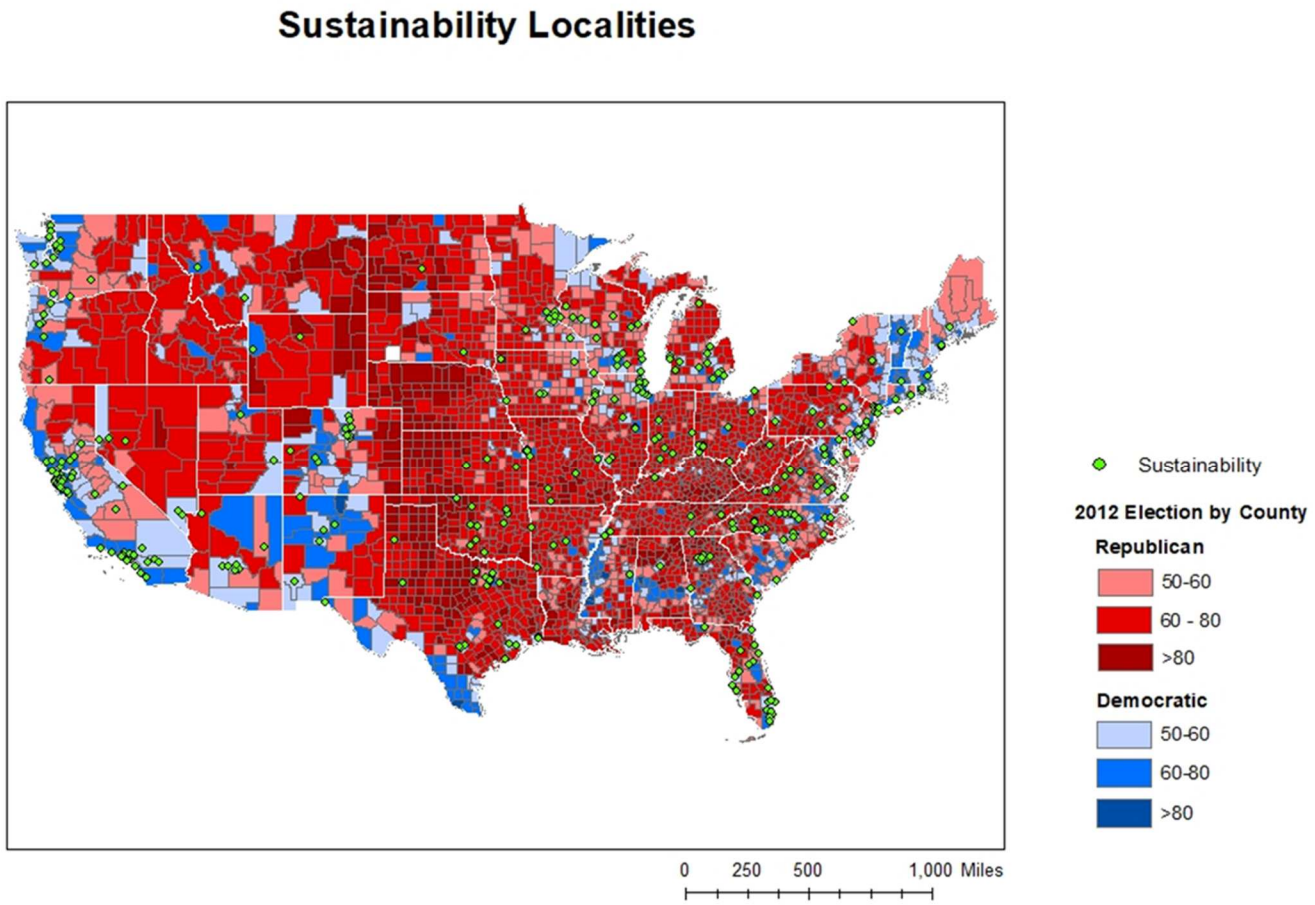
Sustainability Localities
Sustainability
2012 Election by County
Republican
50-60
60 - 80
>80
Democratic
50-60
60-80
>80
0 250 500 1,000 Miles

Fig. 5.2

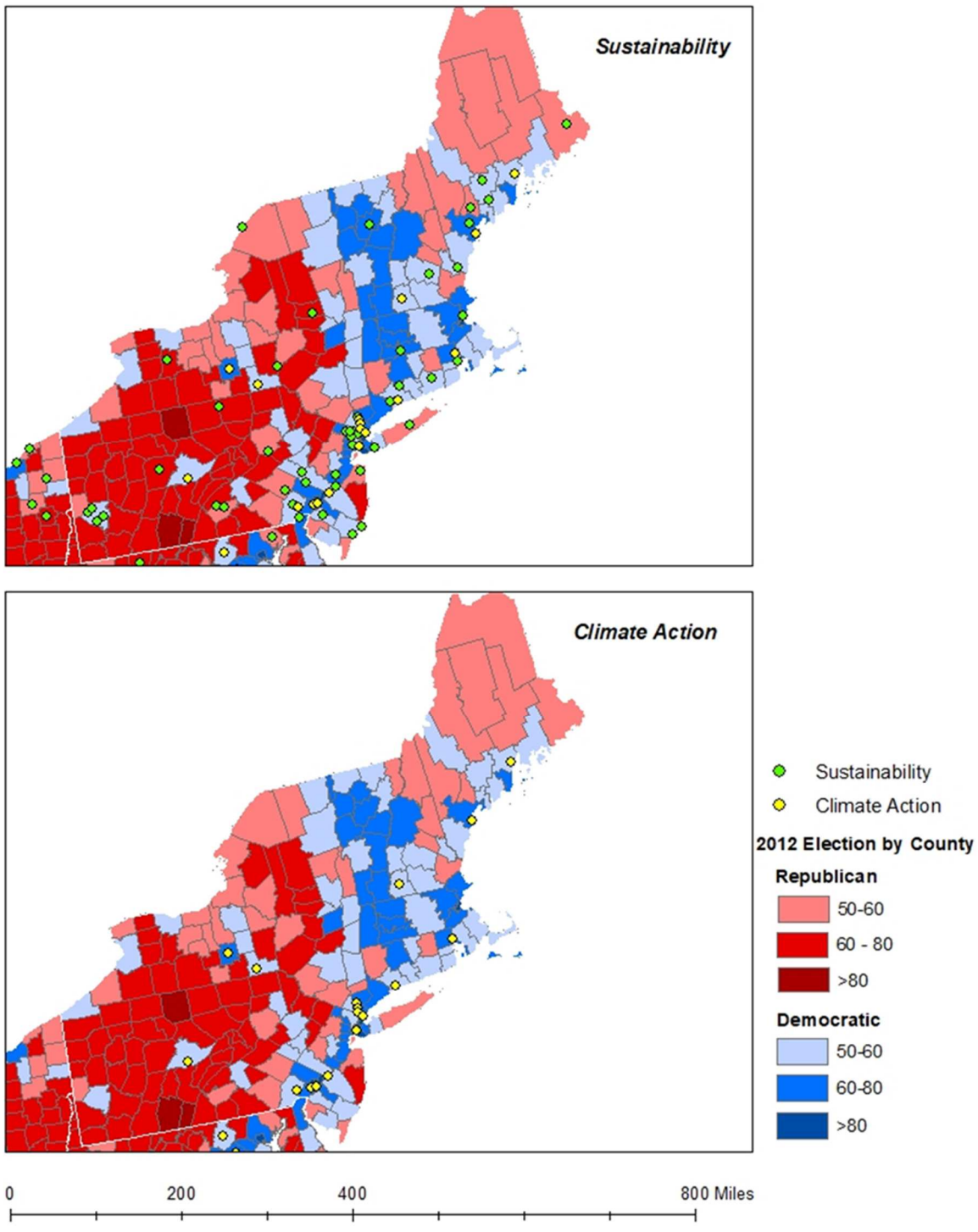
Political Orientation and Local Government Sustainabilty and Climate Action Innovation
Northeast
Sustainability
Climate Action
0
200
400
800 Miles
Sustainability
Climate Action
2012 Election by County
Republican
50-60
60 - 80
>80
Democratic
50-60
60-80
>80

Fig. 5.3

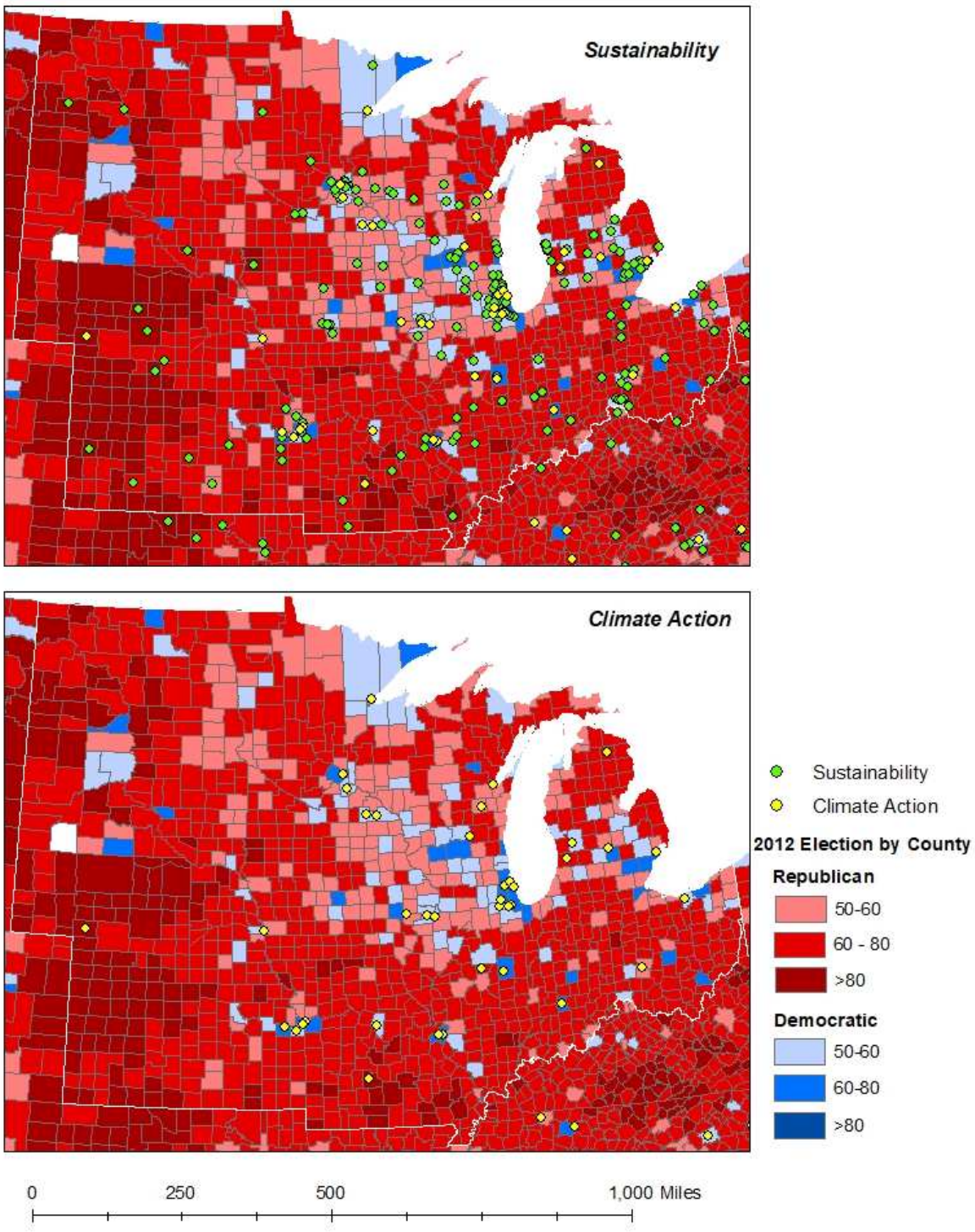
Political Orientation and Local Government Sustainabilty and Climate Action Innovation
Mid-West
Sustainability
Climate Action
Sustainability
Climate Action
2012 Election by County
Republican
50-60
60 - 80
>80
Democratic
50-60
60-80
>80
0
250
500
1,000 Miles

Fig. 5.4

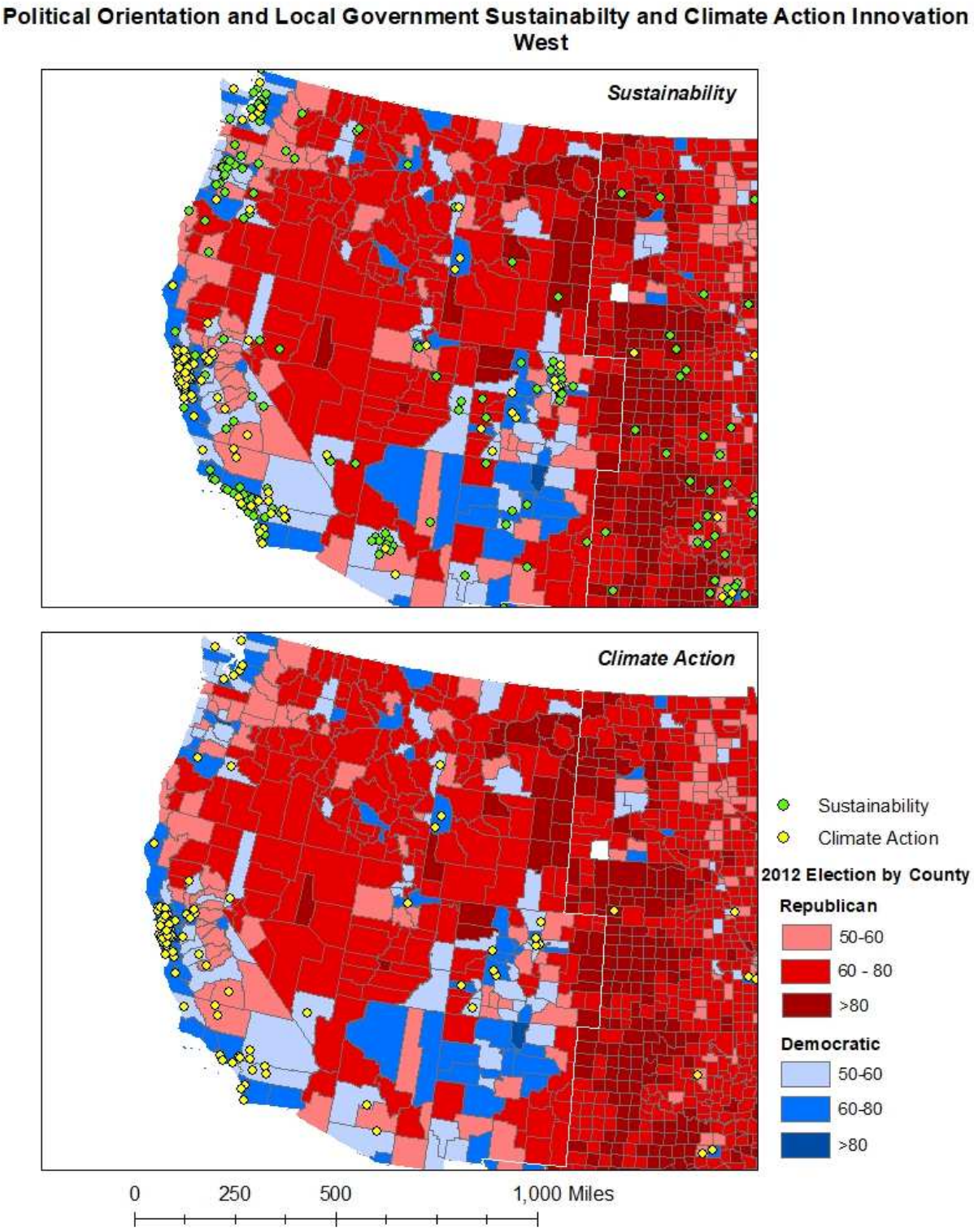
Political Orientation and Local Government Sustainabilty and Climate Action Innovation
West
Sustainability
Climate Action
Sustainability
Climate Action
2012 Election by County
Republican
50-60
60 - 80
>80
Democratic
50-60
60-80
>80
0
250
500
1,000 Miles

Fig. 5.5

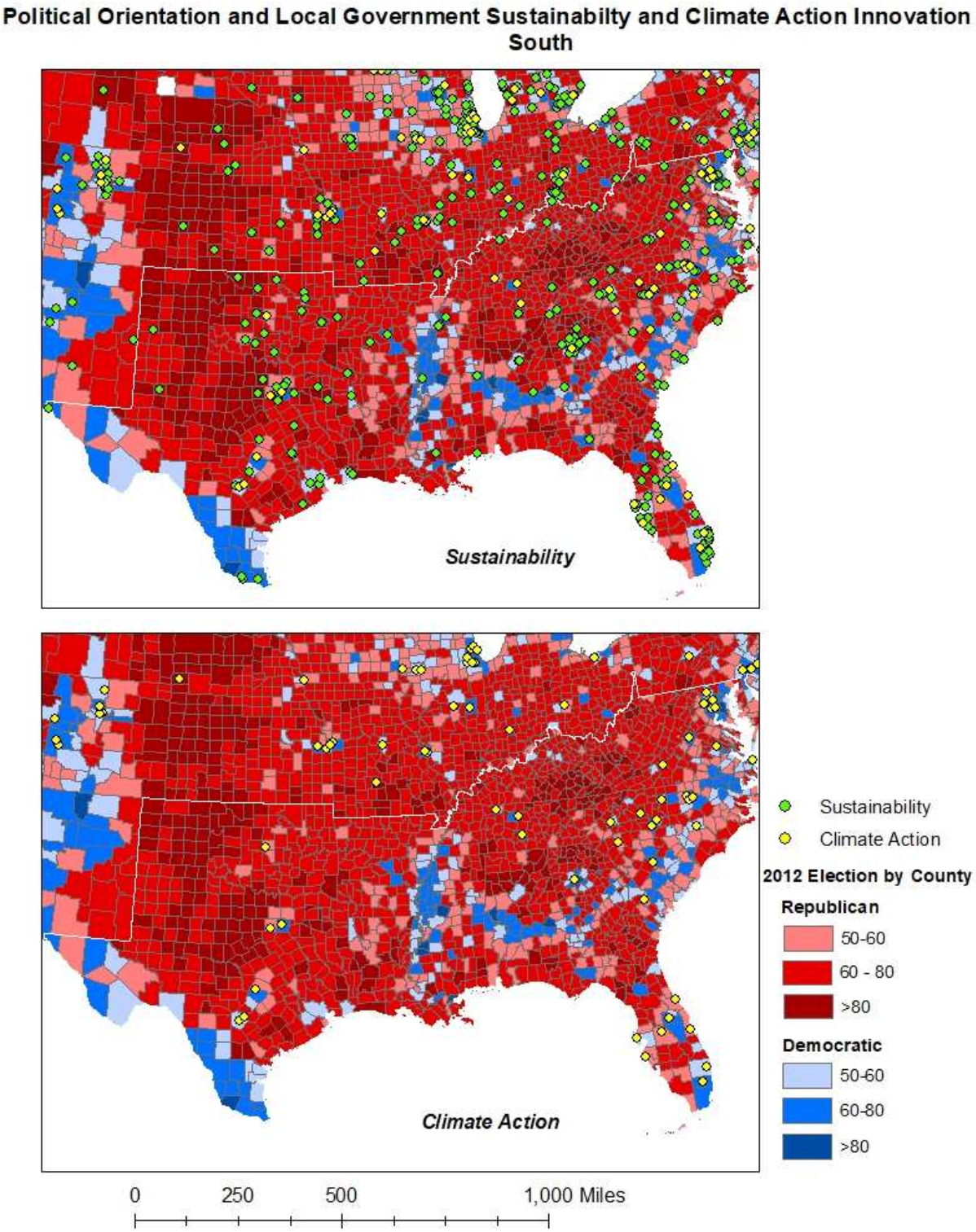
Political Orientation and Local Government Sustainabilty and Climate Action Innovation
South
Sustainability
Climate Action
0
250
500
1,000 Miles
Sustainability
Climate Action
2012 Election by County
Republican
50-60
60 - 80
>80
Democratic
50-60
60-80
>80

Fig. 5.6

5.3 Qualitative Analysis

The study sought to find out why local governments decided to act on climate change at a time when there was widespread anti-climate rhetoric in the national political space. Most of the 21 climate protection managers mentioned that they were not in their current positions at the time of the implementation of the plans but nevertheless proceeded to give their reasons for the local government's initial adoption of the LCAPs either based on their knowledge of the local government's policy behavior or information passed down to them. The reasons were grouped into four may factors; progressive community, mayoral leadership, environmental activist groups and history of environmentalism.

Having a progressive community was mentioned as one of the key reasons for the city's motivation to act. Some of the indicators of the locality being progressive indicated by the interviewees included having a major university, a highly educated populace, and ethnic and racial diversity. The city of Boulder mentioned its highly educated population and the presence of many federal labs that do a lot of climate science work.

Another factor that was mentioned as what makes the locality adopt climate action is mayoral leadership.

> I think we had a very progressive mayor at the time and he really played a role in getting that done…….and I think it continued because the mayor that came after was also environmentally aware and very progressive. (LCAP Manager, City of Columbia, SC, January 29, 2018).

This comes as no surprise given that the adoption of LCAPs was largely engineered by local governments' memberships to TMNs such as ICLEI and MCPA. Most of the pioneering climate protection actions at the local scale originated from the US Mayors' climate protection

agreement which was a direct response to the federal government's failure to be part of the Kyoto protocol. The climate manager of the of Miami-Dade County had the following to say;

> I think at that time he was the county commissioner and he is very environmentally oriented and, somehow, he found out about ICLEI and I guess shared the information, and that is how we initially started to get involved. (LCAP Manager, Miami-Dade County, FL, February 9, 2018)

> We had a very progressive mayor who was interested in the effort and citizens who were interested in committing to that, we had a series of task force discussions, retreats on the part of some of our residents working on this issue and it had political legs at that time. (LCAP Manager, city of Mission, KS, February 7, 2018)

Some local governments cite their longstanding histories of environmentalism as what made them take the lead on climate protection.

> Portland has always been at the leading edge, taking more progressive actions around issues, particularly environmental issues, and so it just seemed like a natural extension of that work. The state of Oregon, I believe, was the first state in the US to have a bottle bill where you pay a deposit on bottle to be recycled, so there is things like that where we have history of making decision that nobody else was making to benefit the environment to conserve the environment and so given what was emerging about climate change and climate science, it that was something that we needed to address so we had city leaders at that time that were interested in doing that. (LCAP Manager, City of Portland, OR, January 7, 2018)

Some of these local governments acknowledged that climate change was not necessarily an issue that their community members were aware of or understood at the time, but the leadership was confident that their citizens will support anything pro-environment, based on their history of environmentalism. Some local governments attribute such environmentalism to a recognition of their ecological wealth from the onset. As a prelude to their climate action plan, the city of Cincinnati cites such recognition of ecological wealth.

> Winston Churchill called Cincinnati the most beautiful inland city in America. The French translated the Native American word "Ohio" as La Belle Riviere (the Beautiful River). Our natural landscapes lend themselves to a variety of outdoor activities through which Cincinnatians can take advantage of this beauty. Now more than ever, being active

> outdoors can be a part of a healthy lifestyle and pathway to a more sustainable lifestyle that emanates from a better appreciation of the natural world. (City of Cincinnati, 2013)

The following quote from the city of Burlington adds to this point;

> I think the last reason is where Burlington is situated, we are very much in touch with our natural environment we see the lake and beautiful view so being very connected to these aspects I think makes a community prone to protection. (LCAP Manager, City of Burlington, January 19, 2018)

According to the climate manager of the city of Fort Collins;

> many residents choose to live in Fort Collins because of its natural beauty and their enjoyment of an active outdoor lifestyle, and therefore will continue to support increased pedestrian and bicycling transportation options and access. (LCAP Manager, City of Fort Collins, CO, January 26, 2018)

The presence of environmental civil society groups within the locality was mentioned by some local governments as the main factor that led them to adopt climate protection measures. They state that some local stakeholder groups saw what was happening around the world with regard to the Kyoto agreement and other climate change related conversations and pressured their local governments to get involved.

> We have lots of vocal and additive environmental activist in the city, they participate a lot in local government, so they vote the commissions, they help council members get elected, they lobby the council members, that is the first thing and that was back in 2007 and it's the same thing now. and then in 2007 the thing that made it happen was the mayor at the time he was active in US conference of mayors and he was part of that initial push of mayors and cities to take action climate action. (LCAP Manager, City of Austin, February 9, 2018)

The climate change manager of the city of Roanoke narrates their situation as follows;

> So the story that people tell about sought how things happened in Evanston was that there was a lot of community support I think there 13 different sought of coalitions that were concern about environment and sustainability and they really pushed the city to take action and also hire a staff person, so there was actually an elected official who was able to find some state funding to hire a sustainability coordinator for the city so that sort of jumped started Evanston effort earlier on was that initial push from community and support from a state representation because that really allowed the local officials like the mayor to sign on to the US climate protection agreement and to be able to say that it had some force with it. (LCAP Manager, City of Evanston, IL, January 12, 2018)

Although the all these factors have been discussed as separate determinants of local climate policy innovation, in most cases they are fundamentally interwoven into each other, but

most importantly they fall under what may be described as liberal communities. The following response from the climate protection manager of Montgomery county sums up this point;

> I guess we are still in the same debate with the Trump administration. I don't know how much you know about Montgomery county, Maryland, we are just outside of DC, we are a county of a little over 1 million people so it's a big jurisdiction, the area is closed down to the district, very urbanized and various areas away from the district, we have a lot of land that we preserved for farmland but because we are located next to DC we have a lot of federal agencies, and in the community we have a lot of people working for the government, local universities. It's a very educated community, I think we have more individuals with PhDs and other graduate degrees than any jurisdiction in the nation or something like that. We are very well educated so as a result of that we are also a very progressive county, we have been at the forefront of a lot of different things. We are very active in the environmental area but also, we are a sanctuary community, so we have something like about 152 different languages spoken in the county, we are very diverse, we welcome immigrants, they have been a big part of our community growth. So, again it's a very inclusive, I will say, liberal, well educated, community so people have always been interested in environmental issues and climate change is obviously the biggest environmental issue we face. I think that is what motivate the community to get involved. (LCAP Manager, Montgomery County, MD, January 31, 2018)

Adding to the argument that political ideology was at the forefront of localities' adoption of LCAPs, the city of Charlottesville cites how the Tea Party failed to convince their local council to abandon their climate protection efforts. However, the surrounding Albemarle County made some concessions in that regard due to the political calculations of its political leadership at the time:

> At some point along the way our elected officials wanted to get away from kind of an international/ large scale efforts like that and wanted to focus on a local action (as they put it) and so we were directed as staff to kind of focus on operational goals, meaning municipal sector of emissions and so we never created a climate action plan for the community. (LCAP Manager, Albemarle County, February 14, 2018)

However, over the years as the county leadership shifted back to independent and now back to democratic, strides have since been made to progress with the climate mitigation efforts.

5.4 Discussion and Conclusion

The overarching premise of this study is that climate change politics has been radical/moral in the United States, which has been the main influencing factor on local governments' adoption of climate protection measures. The GIS analysis revealed that local governments with climate mitigation efforts are overwhelmingly in counties that voted democratic in the 2012 presidential elections, implying that most of the inhabitants are more likely to be ideologically liberal and would support the decision to take action on climate change. Also, when climate action managers where specifically asked what may have motivated their local governments to act on climate change, their responses bordered on having a progressive community, progressive mayors, a history of environmental activity due to their ecological wealth and having active environmental civil society; which are all connected to the liberal ideals of American politics.

Another important take away from this chapter is that although LCAPs are almost exclusively in liberal counties, localities in conservative counties are receptive to sustainability actions. Perhaps because sustainability empathizes co-benefits and the non-carbon related benefits of GHG emissions reduction actions. In other words, the sustainability discourse highlights the enhancement of the overall livability of the locality, which does not appear to be starkly antithetical to the dominant ideological or political beliefs of conservatism. Hence, framing climate action around sustainability may be the ways forward in increasing the innovation of local climate action.

6 The Nature of Local Climate Protection: Areas of Action and Policy Instruments

6.1 Introduction

This chapter relies on the qualitative interviews with the climate protection managers of 21 and five local governments in the United States and Germany respectively as well as the policy documents, progress reports and webpages of their LCAPs, to examine the typical areas of action and policy instruments in climate mitigation efforts. Local government-initiated climate action plans typically have broad action areas towards the goal of effecting social change to bring about reduction in GHG emissions. These include Energy Efficiency, Renewable Energy, Transportation, Waste and Land use. Recently, Equity, Community Engagement and Forestry have become popular additions to the areas of action.

6.2 Developing a Local Climate Action Plan

The International Council of Local Environmental Initiatives' (ICLEI) Cities for Climate Protection (CCP) campaign, established in 1993, is perhaps the first driving force of local governments' widespread adoption of climate action efforts globally. On the other hand, the United States Mayors' climate protection agreement is arguably the primary precipitator of local climate protection measures by local governments in the United States. On February 16, 2005, the Kyoto Protocol, which was adopted on December 11, 1997 entered into force following Russia's ratification, without the United States. Led by the Mayor of Seattle, Mayor Greg Nickels, the U.S. Conference of Mayors sought to fill the leadership vacuum, perhaps symbolically, by getting 141 cities, representing the number of countries that had ratified the Kyoto Protocol, to take up the GHG emissions reduction targets assigned to the United States by the Protocol – 7% reduction from 1990 levels by 2012 (United States Conference of Mayors,

2018). The target was reached by the Mayors' Annual Meeting in June, and more cities continued to join the agreement, reaching 500 members in May 2007 – Currently, there are 1,060 signatories to the agreement (United States Conference of Mayors, 2018).

In these early times, ICLEI was the only transnational organization that presented the most visible resources to support local governments take action on climate change. Most cities that were inspired to take on climate protection, joined ICLEI either as part of its climate change resolution or to utilize the resources it provided in guiding local governments' climate action efforts. For instance, ICLEI designed a five-milestone agenda – conduct a baseline inventory, set a GHG emissions reduction target, develop a local action plan, implement the local action plan, assess the plan and make necessary modification – meant to guide local governments to progressively act on climate change in full swing (ICLEI, 2018). ICLEI also developed a protocol as well as a software that local governments could use in conducting their emissions inventories.

The LCAPs process begins with putting the issue of climate protection before the local government council and a resolution passed to reduced GHG emissions by a certain percent over a certain number of years from a base year. The local government then proceeds to establish a climate action working group, often composed of diverse stakeholders, such as city staff, the local chambers of commerce, academia, environmental civil society groups, and the general public, among others. The overarching mandate of the working group is to conduct feasibility studies on how the GHG emissions goals of the locality could be achieved. The activities of the working groups also often involve the solicitation of public input, carried out through public meetings, townhalls, online and social media discussion platforms.

Climate action plans are often in the broader context of sustainability and, thus, are often part of the responsibility of the sustainability department. Some cities, with the establishment of their LCAP, create a new department and hire new staff to manage it. In some cases, the responsibility is spread out across departments, with each contributing staff time to the climate action efforts. In other cases, the responsibility is added to an already existing department. The climate action office within the local government structure in the United States is largely inchoate.

The practical aspects of LCAPs begin with the performance of GHG emissions inventory. In the case of the US, the Community GHG Protocol developed by ICLEI is heavily relied on by cities for conducting their initial inventories. The Clear Air and Climate Protection (CACP) software model, developed by ICLEI is currently available to assist localities conduct their GHG inventories. The CACP model is endorsed by the National Conference of Mayors and used by most cities and counties

As time goes on, the LCAP may be updated to meet emerging needs. The planning process of plans update is usually much more involving in terms of the breadth of stakeholder consultation and impute. Updated plans also incorporate the idea of co-benefits in addition to explicitly stating the emissions reduction targets. Some plans make community wide outreach and engagement a stand-alone action area, whiles others deploy it as an instrument in the various action areas. Also, new plans have equity as an action area due to the spatial inequality and social exclusion that has emerged from climate protection/sustainability planning, in cities that are advanced in their climate protection efforts. Most of the German local governments in updating their climate protection plans, put together a consortium to conduct a feasibility study, using various scenarios to examine how they could reach their intended goal. The consortium for

the current Berlin LCAP was led by the renowned Potsdam Institute for Climate Impact Research (PIK). The Green City Cluster and the Freiburg Regional Energy Agency conducted a feasibility study for the city of Freiburg's 2050 target.

6.3 Areas of Action and Policy Instruments

Local government-initiated climate action plans typically have broad actions towards the goal of effecting social change to bring about reduction in GHG emissions and, consequently, climate change mitigation. These include Energy Efficiency, Renewable Energy, Transportation, Waste and Land use. Recently, Equity, Community Engagement and Forestry have become popular additions to the areas of action. These areas of action have set goals, with programs designed to meet them. However, very important to the implementation process and the potential success of the individual programs and the policy as a whole is the set of governing techniques that are deployed by the implementing authority – policy instruments. This section discusses the various areas of actions and the type of policy instruments that are deployed to meet their goals.

6.3.1 Types of Policy Instruments

Once a government decides to act on a given policy issue, it carefully selects a set of governing techniques called policy instruments to drive social change towards the desired goals of the policy. Fundamental to addressing social problems through formal policymaking is the ability to select the right combination of policy instruments (Bemelmans-Videc, 2011). "Public policy instruments are the set of techniques by which governmental authorities wield their power in attempting to ensure support and effect social change (Bemelmans-Videc, 2011, p.3).

Government is known for its power of coercion, especially in the policymaking process; hence, it is argued that the "discourse of policy instruments is a discourse on power" (Vedung,

2011, p. 50). However, wielding power does not mean government interventions always involve the use of brute force. As a result, policy instruments are popularly categorized into three main types – regulation, economic and information, also referred to as sticks, carrots and semons respectively – based on the amount of authoritative force government is willing to apply in addressing a given policy issue (Bemelmans-Videc, 2011). In other words, "the government may either force, pay us or have us pay or persuade us" (Vedung, 2011, p.30). It is argued that the choice of policy instruments is a function of the political culture of the polity and the sector of the policy issue. The decision as to whether to use regulation, incentives or information will be a function of the action area and the norms or political culture of the locality.

The regulatory policy instrument type describes when a given political authority puts in place rules and directives which social agents are expected to abide by. A fundamental feature of regulation as mechanism for effecting social change is its authoritativeness – compliance is mandatory (Lemaire, 2011). Regulations often indicate the desired conduct expected of social agents by the policy makers. The most distinguishing element of regulation is its authoritativeness; compliance is mandatory. "Regulation is any attempt by the government to control the behavior of citizens, corporations or sub-governments. In a sense, regulation is nothing more than the government's effort to limit the choices available to individuals within society." (Meier, 1985, p.1). (Meier, 1985)

Economic instruments involve either awarding or taking away of material resources as a mechanism of getting a target population to conduct themselves in a way desired by policy makers. The material benefits awarded or withdrawn could be in cash or in-kind (Bemelmans-Videc, 2011). The most common forms of economic policy instruments are incentives, subsidies and grants. Unlike regulation, noncompliance is an option available to addressees in the case of

economic instruments. Addresses may find the desired action burdensome and, so, may refuse to take the incentive offered without any additional consequences. Other times, they may find the limitation of action worth the incentive or, better still, beneficial (Leeuw, 2017). In addition, economic policy instrument can be further categorized as affirmative (e.g. subsidies and grants) or negative (e.g. taxes, charges, and levies) (Leeuw, 2017).

The information policy instrument type is those governing mechanism that involve the supply of information, communication of reasoned arguments and persuasion (van der Doelen Frans, CJ & Evert, 2017). Information is the most tolerant governing instrument, in that, addressees are basically appealed to by being given knowledge about the issue – the presentation of the bare facts on the issue, the changes necessary to address the issue, and a persuasive argument on why addressees should make such changes – and allowed the freedom of choice between the behavior desired by the policy and their current behavior. This, however, does not suggest that the information policy instrument is politically neutral; essentially, all policy instruments are means to reaching specific political ends. "Information is used here as a catch-all term for outright public communication campaigns; diffusion of printed materials like brochures, pamphlets, booklets, folders, fliers, bulletins, handbills, and posters; advertising; labeling; demonstration programs; counselling; custom-made personal advice; training programs; education efforts; and other forms of amassing, packaging, and diffusion of knowledge and recommendations." (van der Doelen & Evert, 2017, p. 103). Another important character of information is that it can be deployed as an instrument of other policy instruments. It can be used to inform addressees about the existence and content of other policy instruments (van der Doelen Frans, CJ & Evert, 2017). Other times, other policy instruments can be used to facilitate information; for instance, a regulation making labelling mandatory.

6.3.2 Energy Efficiency and Renewable Energy

There are two main goals of the energy sector; (a) to reduce emissions related to electricity and natural gas use in new and existing buildings, typically through various energy efficiency measures and, (b) increase the contribution of renewable energy to the locality's energy mix.

a) Energy efficiency

Energy Efficiency is the most compelling of all climate protection action areas. The overarching goal of the energy efficiency action area is to reduce the energy consumption in buildings and other community infrastructure (such streetlights and traffic lights), leading to a reduction in the locality's greenhouse gas emissions. There are generally two broad goals of the energy efficiency actions of LCAPs. (1) to improve the structural performance of buildings in energy consumption, through programs such as retrofitting, weatherization, retrocomissioning and green building codes; and (2) influencing behavioral change of consumers to energy saving daily practices and use of energy conserving household appliances.

The most widely deployed policy instrument in energy efficiency action is information. One of the strategies of increasing the energy performance of buildings is by using upgraded energy efficiency standards of new buildings and retrofitting old buildings to meet the new standards. This is done by constantly providing up-to-date information on new energy efficiency building standards to key stakeholders such as builders, code inspectors and developers. Technical support is also made readily available to building operators to maintain buildings at high energy performance. Some of the information mechanism include, website development, advertisements in print newspapers, brochures, press releases, public meetings and various types of energy efficiency competitions between neighborhoods or businesses. Also, the maximization of other

policy strategies such as incentives is achieved by creating the awareness of the existence of such programs through information mechanisms.

Although regulation is hardly used as a main policy instrument in energy efficiency efforts, it is used by authorities to promote the dissemination of information. Benchmarking and energy audits require the disclosure of the energy use information of buildings. It is strongly held that disclosing building energy use information can lead to energy efficiency, since renters or buyers will be more likely to go for more energy saving buildings. As a result, property owners would strive for the highest building code standard.

Disseminating knowledge about the energy savings benefits of actions, such as upgrading building codes to green building standards, retrofitting and energy saving daily practices (such as turning off lights when not needed, using household appliances optimally, not cracking up the thermostat too high during winter and down too low the summer) to community members is also generally used. The use of information as a policy instrument is therefore not just about providing facts on the issue but, also, deliberately crafting persuasive arguments or exhortations that seeks to drive target populations towards a certain desirable behavior.

However, providing information on the merits of a certain line of action does not always get the desired response from addressees. The City of Berlin finds residential building energy efficiency measures challenging, because majority of the buildings are old, which require retrofitting. However, most residential dwellings are rented, so there is no incentive on the part of the building owners to spend huge sums of money retrofitting the buildings since the benefits of cost savings from lower energy bills do not come directly to them, but to the occupants of the building (who happen to be mostly renters). The City of Roanoke also finds the same renter-investor dilemma for commercial operations which are largely rental or lease properties.

Regulation is often deployed in the area of energy efficiency through municipal building codes updates. However, not all local municipalities have the authority to update their building codes. This is particularly the case in municipalities in Dillion Rule states, which derive their municipal authority from what is explicitly devolved to them by the state. As a result, negotiations between local government and other tiers of the state, most especially, state governments, has been deployed with success in energy efficiency efforts. For instance, the Municipality of Portland has actively supported the amendment of the State Tax Credit and State Energy Loan Program to encourage green building practices and make the tax credit more accessible to organizations in Portland (Multnomah County, 2015). Another example of intragovernmental negotiation, which is essentially persuasion, and for that matter an information policy instrument, is the continued advocacy for the strengthening of the State of Oregon building code. Also, the Virginia General Assembly enacted a legislation that allows localities to provide property tax reliefs for "going green" at the behest of the City of Roanoke; energy efficient buildings were declared as a separate class of real property for tax purposes during the 2007 general assembly, as a result. This legislation lobbied by the city made it possible for the City of Roanoke to adopt a special tax rate for energy-efficient buildings beginning July 1, 2007 (City of Roanoke VA, 2015).

Next in importance to information policy instruments in energy efficiency action is economic policy instruments. Programs such as retrofitting, weatherization and green building standards for new buildings are mostly carried out using incentives. The city of Burlington has a nationally recognized energy efficiency program which provides, incentives, grants and funding for Burlington-based entities, such as residents and businesses, among others, to reduce energy use in buildings (Burlington Electric Department, 2016), through the collaborative efforts of Vermont Gas Systems (VTGas) and the Burlington Electric Department (BED). BED provides funding

through bonds for energy efficiency programs. Due to the high costs involved in retrofitting (which has to do with the installation of more current energy saving equipment such as HVAC equipment, high efficiency boilers, occupancy sensors, in existing buildings) (City of Burlington VT, 2014), financial incentives are often given out to building owners to encourage them to act. For instance, LEED tax abatements are used to incentivize building owners to make their buildings meet the standards of the most current energy efficient building code. Weatherization is also seen to reduce building energy consumption, but also, save residents money through lower utility bills. The process often involves high cost hence, as part of the climate mitigation strategies, some communities offer free weatherization to low income households (the City of Baltimore has a good weatherization program for low income households) (City of Baltimore, 2013). It can also be a strategy for mitigating climate change while serving low income communities. Low or no interest financing are also used to incentivize consumers to switch to more energy saving home appliances.

b) Renewable Energy

The role of renewable energy in GHG emissions reduction is a no-brainer. In fact, energy efficiency as a measure to curtail GHG emissions could be rendered redundant if 100% renewable energy is achieved for electricity and heating in buildings. However, local governments have very little, if any, control over energy supply except for municipally owned utility situations. The renewable energy sector in the United States is influenced by five key factors: (1) the ownership of utility, weather it is investor owned or municipal owned; (2) State level net-metering rules; (3) third party power purchasing agreements; (4) mandatory renewable energy portfolio and; (5) community choice renewable energy.

The ownership of the utility that supplies the city's energy is identified as the most important factor that determines the strategies deployed by cities towards increasing their

renewable energy mix and the type of policy instruments deployed to reach such goals. The ownership of the municipal utility by the local government presents the greatest opportunity of attaining a 100% renewable energy in the electricity grid, which would mean energy efficiency measures become less useful in GHG emission reduction. The city of Austin's success in reducing its overall GHG emissions largely derives from an increase in contribution of renewable energy to its electricity grid. Currently, the contribution of renewable energy to Austin's energy mix stands at 31%, compared to approximately 4% in 2007 (City of Austin, 2015). This is attributed to the city's ownership of the electricity utility. Increasing the renewable energy mix of the city's energy supply is also the sole source of hope for the city to meet its 2020 emissions reduction goal as it is expected to increase by 65% by 2027 (City of Austin, 2015).

Despite not being able to meet its first set target (2010) the city of Fort Collins, which owns Platte River Power Authority, the electricity utility company, with three other neighboring communities, successfully increased its renewable energy mix through its wind program which was rebranded in 2007 to the Green Energy program (City of Fort Collins, 2015). As the city is considering updating it climate action plan with a new target of 80% greenhouse gas reduction by 2030, Platter River has rendered its full support by modeling scenarios in which it increases the share of renewable energy in its energy supply mix, to meet this new target (City of Fort Collins, 2015).

The city of Alameda has a relatively small per capita GHG emissions compared to other cities because 85% of the energy, supplied by AP&T which is the municipality's owned utility, is generated from renewable sources such as geothermal, landfill gas, wind and hydroelectric (City of Alameda, 2008). In fact, the importance of electricity utility ownership to GHG emissions reduction has led the City of Boulder to adopt the policy goal of "Municipalization" as

one of its key Clean Electricity strategies (City of Boulder, 2017). The goal is to achieve total control and authority of the city's electricity operation as soon as 2023. In 2013, establishing a municipal utility featured prominently in their analysis of clean energy options, in that, the city could quickly shift from a predominantly coal and natural gas (54% and 24% respectively) sources of electricity to over 60% renewable energy sources with no significant changes in costs.

In localities where the electric utility is city owned, the emissions reduction efforts are usually targeted at increasing the utility-scale renewable energy. The renewable energy sources range from privately owned utility-scale solar and wind farms located outside of population centers, procured by utilities through power purchase agreements, as in the case of the city of Austin. Barriers such as the lack of third-party power purchasing agreement, net-metering and renewable energy portfolio standards for utilities which would normally curtail the advancement of residential and commercial solar adoption may not exist in municipal owned utility situations.

The cities of Cincinnati and Boulder, unlike Austin, have investor owned utilities. As a result, their local climate action efforts take both energy efficiency and renewable energy seriously. Given that the electricity utility operations are controlled at the state level, the only way to increase the renewable energy mix at source in investor owned utility situations is through the voluntary actions of the utilities themselves or getting the state regulatory body to increase the renewable energy mix required of all the utility companies operating in the State. In both cases, the go-to policy instrument is information. For instance, the state of Oregon requires that by 2025, all the electricity sold by Portland General Electric and Pacific Power in Oregon be composed of 25% renewable energy sources. One strategy local government have deployed in the bid to increase renewable energy mix of their utilities is lobbying the state legislature and the state public services commission to pass legislation that would either liberalize the energy supply

market to allow for community scale or even individual scale electricity production or increase the minimum renewable energy portfolio required in their energy supply mix. The city of Portland supported the State Senate Bill 1547 that was passed into law in 2016, which now requires the large utilities in Oregon to increase the renewable energy share of their supply to 50% by 2022 (Multnomah County, 2015). In the same law, the utilities are required to completely phase out electricity generated from coal-fired plants by 2025 (Multnomah County, 2015).

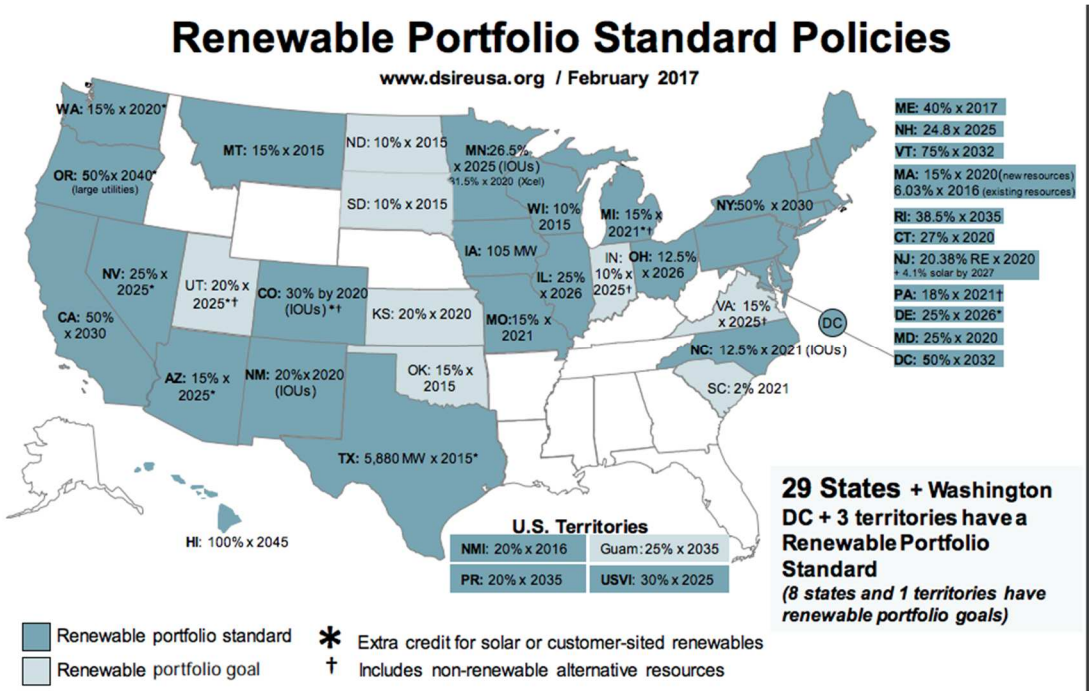

Fig. 6.1

(DSIRE, 2017b)

Since the local government cannot directly order utilities to increase the renewable composition of their energy mix, one of the main ways to get that is to get consumers to demand it. Through information mechanism, consumers are made aware of how heavily reliant their

energy mix is on fossil fuels and the need to switch to renewable energy sources with no significant changes in cost. Hence, the strategies deployed in investor owned utility situations to increase the renewable energy mix are heavily reliant on the individual consumer.

With enabling conditions such as net-metering (the ability of residential and commercial consumers to produce their own energy by installing photovoltaic panels on their roofs and feed any excess into the grid) and 3rd Party Solar PV Power Purchase Agreements (allowing residential and commercial consumers lease out their rooftops to third party solar PV developers and in turn purchase electricity from them) information policy instruments are generally deployed to effect social change in the renewable energy sector. Knowledge of the existence of opportunities to develop renewable energy such as placing PVs on rooftops; incentives to promote renewable energy development; and the prevailing renewable energy installation technology is transferred to residents, businesses and developers among other stakeholders.

For instance, in the case of Boulder, where the utility is investor owned, with only about 8% of its electricity from renewables, including the city's hydroelectric generation, there are more community-wide strategies such as the Boulder Wind Challenge; education of businesses on available renewable energy options, including on-site generation and how to subscribe; promote local renewable energy suppliers; recognize companies for their renewable energy purchases; workshops that educate businesses on renewable energy options and available resources, such as Amendment 37 rebates, federal tax credits, EPA Green Power Partnership to not only create community-wide awareness must stimulate the renewable energy market place (City of Boulder, 2017).

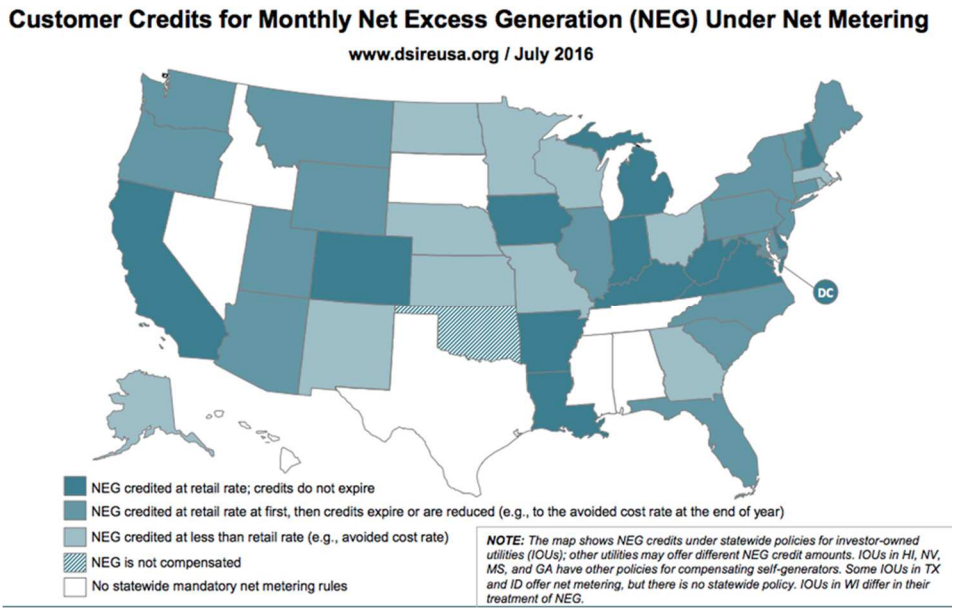

Fig. 6.2

(DSIRE, 2016)

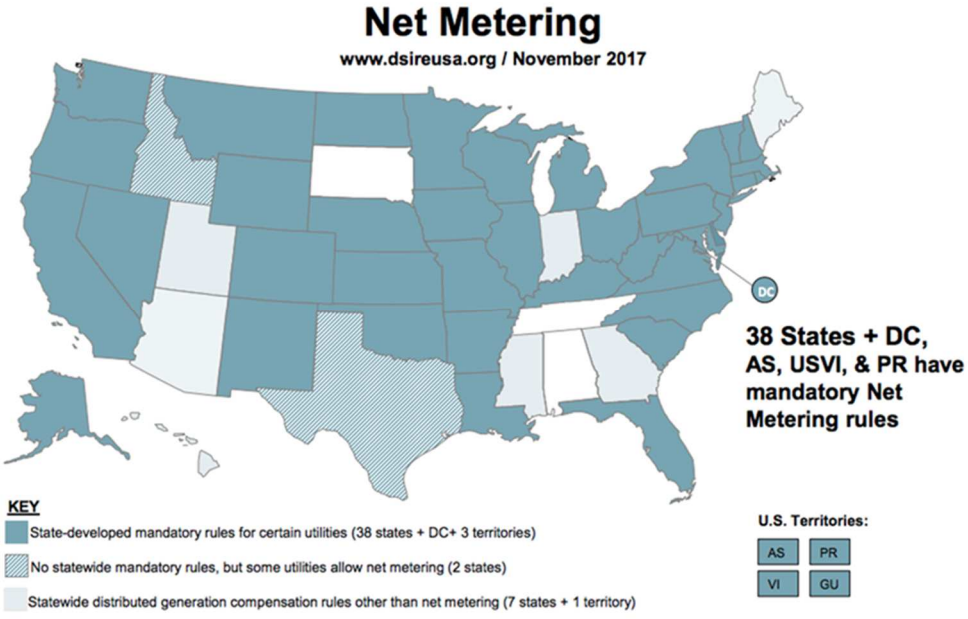

Fig. 6.3

(DSIRE, 2017a)

Other States have the so-called Community Choice Electricity Aggregation (CCA) that is gaining a lot of momentum in the state of California; it allows groups of consumers to opt-out of the investor owned utility and pursue cleaner energy sources. The city of Evanston pursued this option and obtained cheaper electricity supply for a group of residential and commercial consumers. Each household that participated in the program saved about $264.00 and the community carbon footprint was reduced by 77,029 Metric tons of C02 in the first year of the program (City of Evanston, 2012). Also, the city of Mountain view helped found Silicon Valley Clean Energy; any residential or commercial consumer who subscribes is guaranteed 100% carbon free electricity delivered through the existing power lines of PG&E (City of Mountain View, 2018).

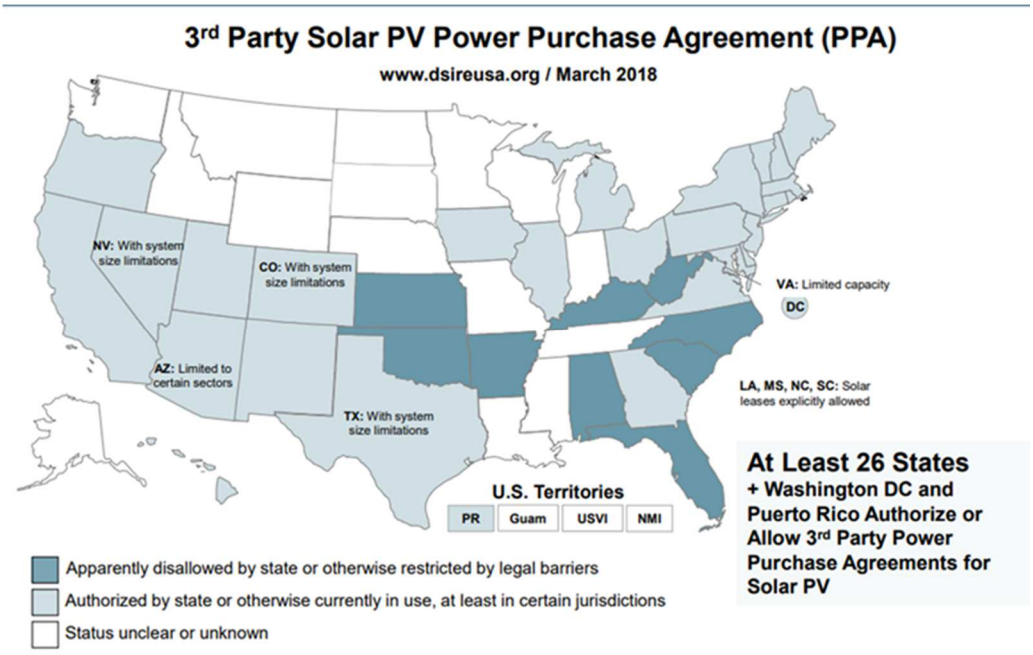

Fig. 6.4

(DSIRE, 2018)

In term of renewable energy development, information stands as the most important policy instrument. This is largely the case because, the utilities commission, the body that governs the energy sector is a state level agency. As a result, utility scale renewable energy increase can only be achieved through exhortation and appeals to the utility companies to do so voluntarily. Also, negotiating with state governments to pass legislation that would mandate utilities to increase their renewable energy portfolios has been another viable option. In terms of the use of economic instruments such as incentives, facilitative policies such as third-party purchasing power agreements must exist first. In situations where such enabling conditions exist, information mechanism are used to make addressees aware of the existence of economic instruments such as subsidies to promote renewable energy growth.

6.3.3 Transportation

There are three broad areas of action in transportation emissions reduction efforts: (1) improving the vehicle fuel economy; (2) reducing Vehicle Miles Travelled (VMT) and (3) reducing carbon intensity of vehicle (shift to electric vehicles). Improving the fuel economy of vehicles is generally seen as an option that cannot be attained by localities in their climate protection efforts – The Corporate Average Fuel Economy (CAFE) standards. The city of Fort Collins attributed its inability to meet its 2010 GHG emissions reduction target to the inclusion of strategies which were not directly under the control of the locality, such as, improving the fuel efficiency standards of vehicles. As a result, the Obama policy of increasing the CAFE standards of vehicles was helpful for local climate action efforts.

The State of Oregon has a Renewable Fuel Standard that requires a minimum blend of five percent biodiesel and 10 percent ethanol in all transportation fuels sold in Oregon. The city of Portland attributes its seven percent decrease in carbon intensity to the increased use of

biofuels in Oregon. Over the last three years, the transportation sector emissions have declined below 1990 levels in Portland.

The most widely pursued area of action in the bid to reduce the transportation sector emissions is reducing VMT. Three main strategies are identified in this area: (1) building a compact city for shorter travel distance between places, so that residence can either walk or bike to places; (2) providing the infrastructure for nonmotorized transportation options such as walking, biking and public transit and (3) transportation demand management such as promoting employer and student bus passes, carpooling, compressed work schedules, parking regulations that discourage single occupancy vehicle use. All these areas of action require the combination of policy instruments, but most importantly, information.

In terms of building a compact city, the key policy instrument is working with the zoning code regulations. For instance, the city of Baltimore introduced a new zoning code under the TransForm Baltimore plan, which is expected to bring about pedestrian-oriented, mixed-use development. Another strategy generally involves generating funding for the construction of infrastructure for safe nonmotorized commutes. The local governments recognize the interjurisdictional nature of transportation and for that matter take a regional approach to transit planning as a way of maximizing the transit infrastructure and reducing the financial burden on individual local governments.

Through the transfer of knowledge, communication of reasoned arguments and moral appeal, nonmotorized modes of transportation are presented to residents as more desirable alternatives to motorized mobility. For instance, the health benefits and financial savings of walking and biking are highlighted in such communication. Economic mechanism are also used alongside, to discourage single-occupancy vehicle commutes to work and encourage transit

ridership by, for instance, giving financial incentive for employees to commute to work via bicycle or parking cash-outs, pre-tax transit.

The shift towards clean energy vehicles also involves marked behavioral change, and financial cost. As a result, information and economic instruments stand as the most important mechanisms for success. Individuals will have to abandon their gasoline vehicles for electric ones, which is a significant change in vehicle taste and performance. Some of the support programs geared towards achieving this change do not only include moral appeals, but also, incentives for the purchase of electric vehicles.

6.3.4 Waste

Emissions from the waste sector are largely from methane emissions from landfills. The main strategies for reducing emissions in this sector are methane capture and reduction of waste sent to landfills, through solid material recycling and reuse and organic matter composting. For instance, the city of Portland was able to reduce its waste related emissions by 82% since 1990 by reducing landfill waste, through recycling, composting, and methane capture at landfills. The key policy instruments deployed in the effort to reduce waste related GHG emissions is information. State-of-the-art marketing campaigns or outreach programs are carried out to educate residents and businesses on the importance of, and encourage them to adopt, waste reduction practices. In some instances, regulations such as plastic bag bans and requiring trash haulers to provide unlimited curbside recycling services to all their residential customers have been deployed. Another important economic policy instrument in this sector is the use of incentives. Adopting a cart-based trash collection service in the locality or a Pay-As-You-Throw (PAYT) system presents an economic incentive for residents to recycle and compost.

6.3.5 Land Use

The Land Use sector is closely related to the effort to reduce VMT, by creating a compact, interconnected, mixed-use city towards the GHG reduction goals of the transportation sector. Building within city limits does not only create a compact city, leading to emissions reduction, but also, more residents are served by city facilities. Also, the effort to get people to switch to alternative means of transport, such as walking, and biking can be tied to a healthier lifestyle to curb obesity and diabetes. Besides educating residents on the desirables of compact living and nonmotorized transportation, code updates, most importantly, the zoning codes and financial incentives to developers to embark on public interest projects in strategic locations, are also resorted to.

6.3.6 Food

Another area of action in updated climate mitigation efforts is food. Emissions from food are consumption-based, which are typically not included in the calculation of local GHG inventories. However, treating food as an action area in climate mitigation efforts is an indirect objective. The idea is that some of these actions may not be specific to the reduction of GHG emissions but contribute to an enhancement of the overall sustainability status of the city and the creation of a pro-environment sense of awareness among inhabitants, which could increase their acceptance and participation in GHG reducing specific actions.

The main type of policy instrument deployed in reaching the goals of this area of action is information, as individuals and groups are implored and persuaded to adopt energy saving food consumption practices such as low meat diets, patronizing local farmers' markets and going into community farming themselves.

6.3.7 Social Justice

Besides the disproportionate consumption patterns that make high income earners fundamentally responsible for anthropogenic climate change, with their low-income counterparts at the receiving end of its negative impacts, unmitigated mitigation measures also mete out injustices to the same low income/minority groups. Overtime, the relentless planning and implementation of land use and transportation developments that seek to reduce GHG emissions have resulted in the gentrification of neighborhoods and the displacement of low-income/minority folks and small businesses. Also, some of the co-benefits of carbon reduction efforts are reported to elude low income households and communities of color. The walkable and bikeable neighborhoods, energy efficient housing, and the healthy locally grown foods may not be within the reach of such communities.

> You ask somebody why they like living here and they would tell you because they can walk to places, a good transit, but there is a big portion of our communities where that is not true, and those communities have been left out over the years. So, it is the right thing to do (mitigate against inequality and injustice) but also the reason that we are doing it is because if we are going to achieve an 80% reduction by 2050 there is no way we can do that if we are leaving 1/3 of the city out of the equation, so we have to try to figure out how to make it possible for those communities that do not have access to those low carbon opportunities and lifestyle choices to have those opportunities, so that they can help contribute towards that long term goal. (LCAP Manager, City of Portland, OR, January 7, 2018)

Based on the experiences of some of the pioneering localities, equity and social justice is now emerging as an integral part of climate protection efforts. As part of their climate mitigation efforts, localities make conscious efforts to mitigate against gentrification and social exclusion through housing policies that create income diversity in neighborhoods. Also, it is not expected that regulatory mechanism will be used to ensure that low income individuals also enjoy the largesse of the 'green city', by for instance, securing affordable housing close to public transit and other community amenities such as parks. In addition, funding mechanism such as free

weatherization is deployed to include low income households in energy efficiency. Communities that are impacted by the unintended consequences of climate action planning or those underrepresented or under-severed by the city's amenities can be specifically targeted for development and implementation of climate change mitigation policies that take care of the inequity and justice problems.

6.3.8 Community Engagement and Outreach

Local climate action essentially requires working closely with residents and local businesses, which explains why information appears to be the most important policy instrument deployed. As a result, community engagement and outreach, stands as an action area in most LCAPs. Climate change has proven to be a complex and a politically divisive subject; hence, the transfer of knowledge and reasoned communication is seen as an important strategy for engendering an understanding and, the generation of some level of community-wide consensus, on the subject. Outreach sets the groundwork for broader participation through public engagement and shifts the role of the public from knowledge bearer to participants or owners of the decision making. A deliberate public engagement involves scheduled town hall meetings and online discussion boards.

The success of any policy is incumbent on how it is received by its target population. However, climate change lacks some of the fundamental ingredients that generates immediate public support for a given policy issue. It is argued that for a policy issue to gain traction, it should have social significance (appear to address a legitimate problem in society); temporal relevance (appear to need immediate attention); and be non-technical (easy to understand by people of all walks of life (Cobb & Ross, 1997)). The following statement from one of the climate managers summarizes climate change's public appeal deficiency;

> I think I will make a couple analogies to that. I will say that working in climate action is very similar to trying to encourage people to save for their retirement; it's not an immediately pressing issue, it's not the issue de jour. Whether that is getting your kids to daycare, putting a meal in front of your family, paying your bills, these types of things are. It is very difficult for these longer-term issues (climate change) to have the same sense of urgency as some of the day-to-day. I think that is one of our biggest challenge. (LCAP Manager, City of Fort Collins, CO, January 26, 2018)

Community Engagement and outreach now exists as a stand-alone action area in most LCAPs, and not just as a policy mechanism deployed in other areas of action. Besides keeping community members informed of the need for climate protection, strategies in this category seek to empower individuals, businesses and the community to be receptive of GHG reducing practices. Some of the outreach mechanism used include website postings, brochures, social media accounts, town halls etc. For instance, the city of Evanston has the annual Green Living Festival which seeks to promote the adoption of a green lifestyle among the citizenry. The festival provides a platform for exhibitions and speeches by local green organizations and businesses. The theme of the 2011 Evanston Green Living Festival was "Alternative Energy You've Got the Power!" (City of Evanston, 2012). The goal was to show the community how they could take advantage of powering their homes and businesses with renewable energy.

6.3.9 Forest and Natural Systems

Forest cover and other natural systems such as wetlands are important for carbon sequestration. The world's forests took up as much as 30% (2 petagrams of carbon per year; Pg C year−1) of the anthropogenic GHGs emitted annually in the last 10 years (Bellassen & Luyssaert, 2014). However, in terms of local climate action, there is not as much effort in the area of carbon sequestration. The city of Austin's climate manager acknowledged the importance of carbon sequestration but pointed out that the reason the city has not pursued it is because the city is built up and there is no space to grow forests for carbon sequestration. Another climate

manager explained that they are reluctant in including carbon sinks in their plan because they don't want to appear as though they can continue to emit GHGs simply because they are able to offset their emissions through sequestration.

The focus of local climate action plans in the area of forest and natural systems has other benefits such as water conservation, storm water management, control of urban heat islands and water quality providing habitat for wildlife, increasing property values, and giving the city an aesthetic uplift through flowering plants. Promoting a green city is not only limited to the benefit of reducing GHG emissions, but also, improving the overall livability of the community is emphasized. The city of Baltimore has the Umbrella Group that brings together non-profit organizations and residents to promote tree planting for the purposes of carbon sequestration, reduction of urban heat islands and storm water control.

Some cities are now starting to consult on how to make carbon sequestration a part of their climate action efforts but haven't fully implemented any policy in that area yet. In some cases, locality may not have explicit carbon sequestration strategies in their climate protection efforts, but they have tree canopies or conservation encasements, which they strive to maintain for their carbon holding benefits. The city of Roanoke has a 600 acre carbons cove and about a 48% tree canopy which are protected. The city of Hayward has the marshy shoreline in the Francisco Bay which is considered vital to carbon sequestration.

6.3.10 Economy Sector

In the German LCAPs, the economy features as one of the areas of action. There is an emphasis on harmonizing climate protection and economic growth through partnerships and networks of businesses. Private companies and associations also make voluntary GHG emissions reduction pledges. Companies are generally aware of their social responsibility and consider

climate change mitigation as one of them. The city of Berlin has developed a climate protection agreement with companies and associations as part of its LCAP. The city of Freiburg is currently viewed as "a model for the reconciliation of "soft" ecology and "hard" economics" (City of Freiburg, 2017) P.2.

> Environmental policy, solar technology, sustainability and climate protection have become the drivers of economic and political growth along with urban development. And yet, what matters even more than prizes and global back-slapping, is the fact that the people of Freiburg identify strongly with this policy and their city. (City of Freiburg, 2017, p.2)

The main policy instrument used in this action area is semons; basically, negotiations between local governments and private businesses.

6.4 Conclusion

Relying on the in-depth interviews with the climate mitigation managers, policy documents, progress reports and website data on the LCAPs of 21 and five local governments in the United States and Germany respectively, this Chapter examined the nature of local climate protection efforts. It highlighted the typical areas of action and types of policy instruments deployed in local climate mitigation efforts.

In the discussion on policy instruments, it is assumed that non-decision as a policy action is non-existent, but that government has made the policy decision to act upon the issue. However, the fundamental question is whether government should use its power of coercion to the fullest; give or take material resources; or make moral appeals to derive compliance of addressees – what type of policy instrument should be deployed in addressing the issue? It is argued that policy instruments are selected based on political culture of the given jurisdiction and the issue area.

With regard to climate action, the type of policy instruments that are deployed is largely due to the political authority of local governments and the area of action. As has been discussed above, the coercive power of local governments is somewhat limited, hence, regulation which includes the threat of sanctions for non-compliance is hardly an option available to local governments. Information policy instruments such as the transfer of knowledge, persuasive arguments or exhortation, mostly crafted and delivered in a manner that seeks to make compliances with the desired behavior more likely, are the most relied upon in local climate action.

The use of information instruments, as exemplified in the economy action area predominantly developed in German LCAPs, can bring aboard unlikely actors. Climate mitigation is often viewed as adverse to economic activity, however, as demonstrated by the actions of the cities of Berlin and Freiburg, persuasion and exhortation can be used to bring them together.

The legitimacy of climate change as a pressing social problem also influences the type of policy instruments that are deployed. In situation where the legitimacy of a given issue is yet to gain strong grounds among the population, an important strategy would be to first introduce the least coercive instruments to make the issue more familiar and weaken the resistance against it; in this case information (Doern & Phidd, 1983). This then paves the way for the deployment of more coercive instruments such as regulations in the future.

7 The Efficacy of Local Climate Protection Efforts

7.1 Introduction

The United States' total greenhouse gas (GHG) emissions for 2013 was 6,742.2 million metric tons, representing a 7% increase above 1990 levels (U.S. Environmental Protection Agency, 2015; United States Environmental Protection Agency, 2014). In contrast to the modest achievement in the overall U. S. GHG emissions reduction, Germany, Europe's largest single emitter of CO2, has achieved remarkable success in emissions reduction over the years (European Union Environment Agency, 2014). In 1990, Germany's CO2 emissions were1,248 million metric tons: this dropped to 939.1 million metric tons in 2012, representing a 24.8% decrease below 1990 levels (European Union Environment Agency, 2014).

In recent times the 'city'/ 'urban'/ 'local' has been deemed as the most suitable scale for managing global climate change. This is evident in the increasing numbers of cities joining Transnational Municipal Networks (TMNs) for climate protection such as ICLEI, the C40 Cities, the Cities for Climate Protection TM (CCP); The covenant of Mayors; and Climate Alliance. The fundamental question is, does the local scale truly possess the 'willing' and 'ability' qualities often attributed to it in the discursive local scaling of climate action? This chapter seeks to answer this question in two dimensions; (1) by examining the performance of localities in their GHG emissions reduction efforts, individually and cumulatively; and (2) by bringing to light the mediating conditions the impact the capacities of localities in their climate efforts – the conditions and policy instruments that enable them and the conditions that challenge them. Since funding is very crucial to nearly any type of policy, the funding mechanism and sources utilized by localities in the climate mitigation efforts are also examined and brought to light.

7.2 Greenhouse Gas Emissions

German localities are some of the pioneers of LCAPs globally. Some localities had taken the lead in setting emissions reduction targets long before the federal government set its first GHG emissions reduction target in 1990. Except Hamburg, that completed its first LCAP in 2007, the other four cities studied, Heidelberg; Hanover; Freiburg and Berlin, completed theirs between 1992 and 1996. The adoption of LCAPs in the United States on the other hand, begun much later. The City of Portland, which completed its climate action plan in 1993, however, is one of the few American localities that started climate protection around the same time as the German localities. Most of the cities in the United States developed their climate action plans through their membership to US Mayors' Climate Protection Agreement which was initiated in 2005; hence, majority of the local governments completed their first plans between 2008 and 2010.

Conducting inventories regularly in order to track the progress of GHG emissions reduction is fundamental to local climate protection. All localities embarking on climate protection would normally pick a base year for their emission reduction targets. For instance, the Kyoto Protocol base year GHG emission, for which future GHG emissions of parties were expected to measure against, was 1990. Along with the base year is the emissions reduction target, usually a percent of the base year emission. Lastly, a target year, by which time the programs and strategies of the LCAP are expected to yield the set emissions reduction target, is also determined.

7.2.1 Analysis

Eight out of the twenty-one local governments studied in the United States, representing 38%, recorded emissions reduction since the implementation of their plans. Five of the remaining 13 localities recorded increases in their emissions and eight had no data on their GHG emissions.

All the German localities studied have recorded decreases in their GHG emissions, with Berlin exceeding its target of 25% reduction below 1990 levels.

The number of localities in this study may seem significantly small, compared to, for instance, the 1,060 localities that have signed onto The U.S. Conference of Mayors' Climate Protection Agreement, "vowing to reduce carbon emissions in their cities below 1990 levels " (United States Conference of Mayors, 2018). However, it was observed that a significant number of localities that have made commitments to trans-municipal networks to act on climate change have not proceeded to take practical policy action. Hence, examining the GHG emissions reduction performance of some of the pioneering cities that have taken tangible policy actions is sufficient to give a better sense of the efficacy and future of local climate action towards the global goal of climate change mitigation.

U.S. LCAPs' GHG Emissions Change

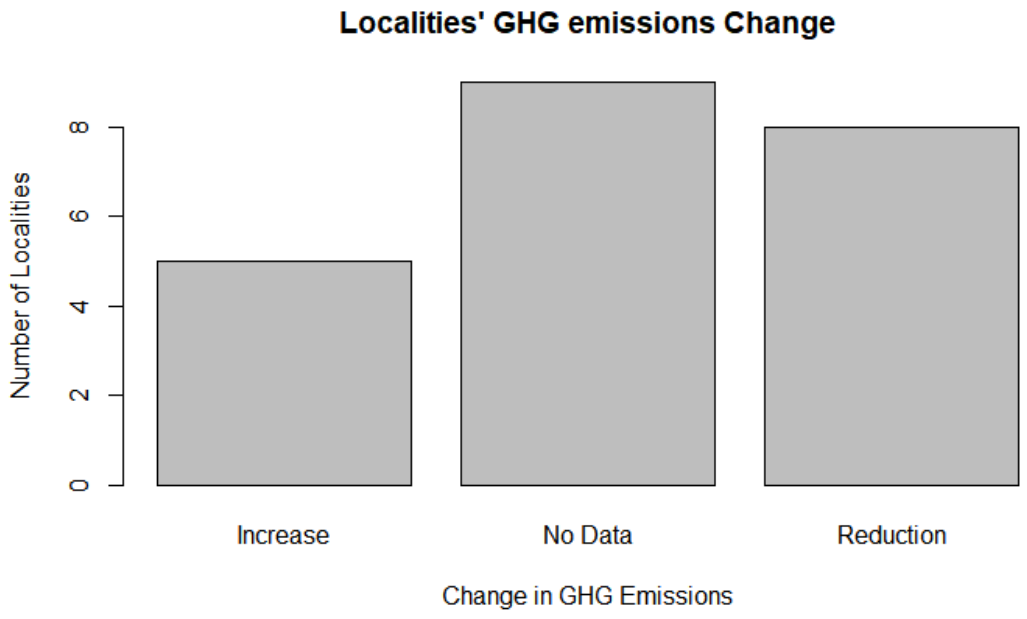

Fig. 7.1

All the US localities that reported emissions reduction either met or exceeded the Kyoto requirement for the United States – 7% below 1990 levels by the year 2012. This is an indication that if localities are ambitious enough, LCAPs have the potential of bringing about meaningful GHG emissions reduction. However, besides the localities that reported increases in their emissions, an equal number of localities had no inventory data to assess their progress in emissions reduction. Conducting inventories regularly and tracking GHG emissions is fundamental to climate change mitigation, hence, the lack of data, in itself, is a measure of the performance of the locality's efforts. In fact, all the cities that reported reductions in their emissions, updated their LCAPs at least once; demonstrating the importance of monitoring and evaluation of actions to success.

As demonstrated by the localities that either recorded increases in their GHG emissions or did not have inventory data to determine their progress, joining climate mitigation agreements or even passing resolutions to act and setting emissions reduction targets is a long way from actual action and success. Although the number of localities' GHG emissions examined in this study is not representative of all local climate protection efforts in the countries, it can be concluded from the findings – given that these are some of the pioneers of LCAPs, particularly in the United States – that if the current trend continues, the cumulative emissions reductions of LCAPs cannot make up the national targets (largely based on the number of successful LCAPs), and for that matter, the needed global GHG emissions reductions to contain global average temperature increase within the 2□ C limit.

Hence, while the number of localities taking interest in climate protection is on the rise, they must individually embark on ambitious and aggressive GHG emissions reduction measures for their actions to add up to make a global impact.

Table 7.1
Study Localities GHG emissions; United States

Local Government	State ID	Population	Form of Government	Completed Plan	Base Year	Target Year	Target	Percent Emissions Change	Base Year of Change	Inventory Year	Times Updated	Utility Ownership	Government Authority
Cincinnati	OH	296950	Mayor-Council	2008	2006	2012	8	-17.5	2006	2015	2	Investor	Home Rule
Portland	CO	581496	Commission	1993	1988	2010	20	-14	1990	2013	2	Investor	*NA*
Roanoke	VA	96922	Council-Manager	2009	2005	2014	10	-13.4	2009	2014	1	Investor	*NA*
Boulder	CO	97468	Council-Manager	2002	1990	2012	7	-13	2005	2016	1	Investor	Home Rule
Evanston	IL	74486	Council-Manager	2008	1990	2012	13	-13	2005	2012	1	Investor	Home Rule
Fort Collins	CO	144073	Council-Manager	1999	2005	2020	20	-12	2005	2016	2	City	Home Rule
Hayward	CA	144342	Council-Manager	2009	2005	2013	6	-8.5	2005	2010	1	Investor	*NA*
Austin	TX	758386	Council-Manager	2014	2005	2020	*NA*	-7	2010	2016	1	City	Dillon's Rule
Creve Coeur	MO	17833	Council-Manager	2010	2005	2015	20	1.6	2005	2015	1	Investor	Dillon's Rule
Burlington	VT	42417	Mayor-Council	2000	1990	2005	10	6	2007	2010	1	City	Dillon's Rule
Mountain View	CA	74056	Council-Manager	2009	2005	2012	5	6.9	2005	2012	1	Investor	*NA*
Charlottesville	VA	43435	Council-Manager	2013	2000	*NA*	*NA*	7	2000	2011	0	Investor	Dillon's Rule
Alameda	CA	73812	Council-Manager	2008	2005	2020	25	11	2005	2015	0	City	Charter City
Albemarle County	VA	98970	Executive	2009	2005	2020	15	*NA*	2000	*NA*	0	Investor	Dillon's Rule
Baltimore	MD	621115	Mayor-Council	2012	2010	2020	15	*NA*	2010	*NA*	0	Investor	*NA*
Columbia	SC	129483	Council-Manager	2007	1990	2012	7	*NA*	*NA*	*NA*	0	Investor	Home Rule
Durham	NC	228374	Council-Manager	2007	2005	2030	30	*NA*	*NA*	*NA*	1	Investor	*NA*
Miami-Dade County	FL	2496435	Commission	2009	2008	2020	20	*NA*	2005	*NA*	0	Investor	*NA*
Mission	KS	9323	Mayor-Council	2009	2005	2020	20	*NA*	*NA*	*NA*	0	Investor	*NA*
Montgomery County	MD	971777	Executive	2009	2005	2050	80	*NA*	*NA*	*NA*	0	Investor	Home Rule
Tacoma	WA	198397	Council-Manager	2008	1990	2012	15	*NA*	*NA*	*NA*	1	City	*NA*

Table 7.2
U.S. Local Governments greenhouse gas emissions reduction

Local Government	State ID	Population	Form of Government	Completed Plan	Base Year	Target Year	Target	Percent Emissions Change	Base Year of Change	Inventory Year	Times Updated	Utility Ownership	Government Authority
Cincinnati	OH	296950	Mayor-Council	2008	2006	2012	8	-17.5	2006	2015	2	Investor	Home Rule
Portland	CO	581496	Commission	1993	1988	2010	20	-14	1990	2013	2	Investor	*NA*
Roanoke	VA	96922	Council-Manager	2009	2005	2014	10	-13.4	2009	2014	1	Investor	*NA*
Boulder	CO	97468	Council-Manager	2002	1990	2012	7	-13	2005	2016	1	Investor	Home Rule
Evanston	IL	74486	Council-Manager	2008	1990	2012	13	-13	2005	2012	1	Investor	Home Rule
Fort Collins	CO	144073	Council-Manager	1999	2005	2020	20	-12	2005	2016	2	City	Home Rule
Hayward	CA	144342	Council-Manager	2009	2005	2013	6	-8.5	2005	2010	1	Investor	*NA*
Austin	TX	758386	Council-Manager	2014	2005	2020	*NA*	-7	2010	2016	1	City	Dillon's Rule

Table. 7.3
German localities greenhouse gas emissions reduction

Local Government	State	Population	Completed Plan	Base Year	Target Year	Target	Percent Emissions Change	Base Year of Change	Inventory Year	Times Updated
Berlin	Berlin	3470000	1994	1990	2010	25	-27	1990	2010	2
Freiburg	Baden-Württemberg	222203	1996	1992	2010	25	-20.7	1992	2010	
Hamburg	Hamburg	1763000	2007	1990	2012		-16	1990	2008	
Hanover	Lower Saxony	523642	1992	1990	2005	25	-7.5	1990	2005	3
Heidelberg	Baden-Württemberg	154715	1992	1987	2015	20	-5	1987	2015	2

7.2.2 Sectoral Analysis

Based on the inventories of subnational jurisdictions, the energy sector competes with the transportation sector for the largest contributor to GHG emissions; while in some local jurisdiction the energy sector is the highest contributor to GHG emissions, in many cities the transportation sector occupies the top spot.

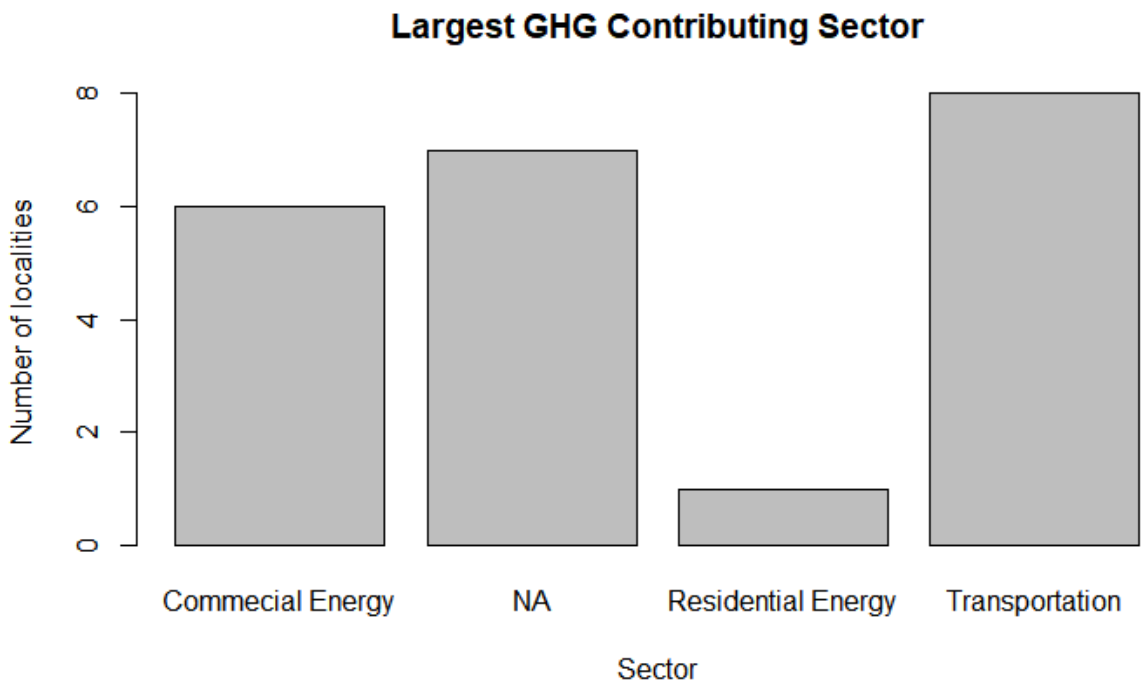

Fig. 7.2

Carbon intensive mobility is an integral part of western civilization, and personal car ownership is practically a necessity in most places in the United States. It is therefore not surprising that the transportation sector generates the largest share of GHG emissions in the United States and, is also the least successful in the GHG emission reduction efforts of LCAPs. Poor public transit systems and the predominance of single occupancy vehicle use persist as the

main reasons for the difficulty in cutting transportation emissions. For instance, in the city of Austin, about 75% of the community drive in single occupancy vehicles, and the electric vehicle fleet is only about 6,000 out of a total of 600,000 vehicles (City of Austin, 2015).

In addition, most American cities are designed to be car dependent (LCAP Manager, Miami-Dade County, FL, February 9, 2018). Even in situations where the necessary infrastructure for non-motorized transportation is provided, the general car culture makes it difficult to get people out of their cars and embrace other modes of transports as equally viable ways of commuting. The city of Portland which is relatively advanced in climate protection has the peculiar problem of new commers to the city still holding onto their car-dependency attitudes from their former cities, and not willing to adapt to the idea of walking or taking public transit (LCAP Manager, City of Portland, OR, January 7, 2018).

The transportation sector is also burdened with emissions from facilities that may not be controlled by the locality but contribute to its emissions inventory. The climate managers of the cities of Hannover and Miami-Dade County stated the existence of Ports and airports within their territories, as adding another layer of complexity to their GHG emissions reduction efforts in the transportation sector. Also, the capital-intensive nature of transportation infrastructure makes it difficult for single municipalities or localities to influence major shifts in public transit.

The city of Portland which is advanced in climate protection has the peculiar problem of new commers to the city still holding onto their car-dependency attitudes from their former cities, and not willing to adapt to the idea of walking or taking public transit.

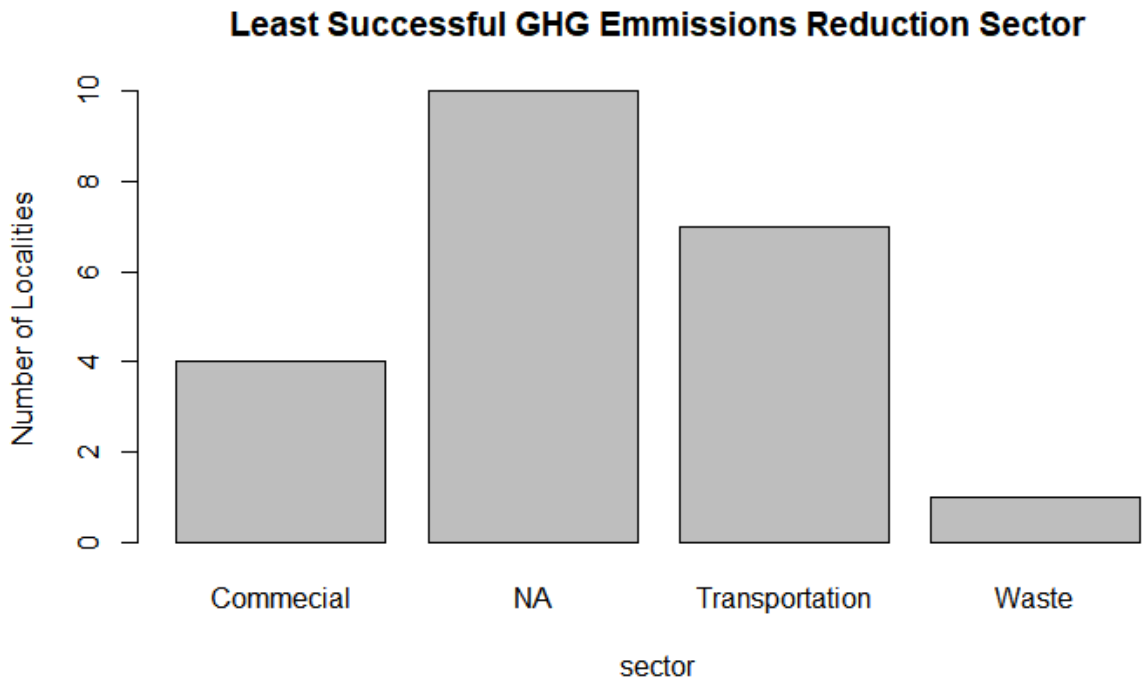

Fig. 7.3

Examining the LCAPs policy documents and responses of local climate action managers, the waste sector emerged as the most successful in terms of their GHG emissions reduction efforts. It is also the least contributor to most localities' GHG emissions, largely due to methane capture at landfills. Although most LCAPs employ the strategies of 'reduce', 'reuse', and 'recycle', a significant amount of waste still ends up in in landfills, where it produces methane from decomposition. Methane is about 25 times more powerful as a GHG than carbon dioxide, but it can be captured at landfills or burned for electricity.

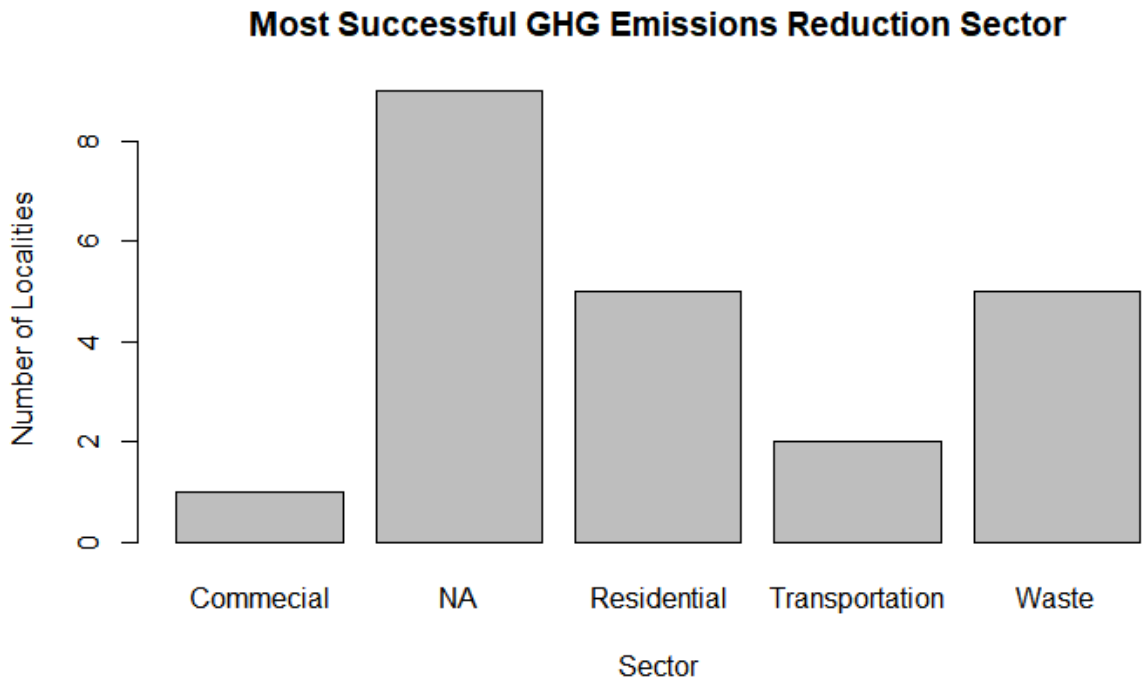

Fig. 7.4

7.3 Enabling Conditions and Instruments of LCAPs

Local governments identify certain prevailing conditions as well as policy instruments that are enablers of their climate protection efforts. One such conditions is utility ownership. For instance, the cities of Austin and Fort Collins attribute their relative success in reducing GHG emissions to the fact that they own their electric utility. Currently, the contribution of renewable energy to Austin's energy mix stands at 31%, compared to approximately 4% in 2007 (City of Austin, 2015). Increasing the renewable energy mix of the city's energy supply is also the sole source of hope for it to meet its 2020 emissions reduction goal, as renewable energy is expected to increase by 65% by 2027 (City of Austin, 2015). In the City of Fort Collins' process of updating its climate action plan, with a new target of 80% GHG reduction by 2030, Platter River, the electric utility, rendered its full support by modeling scenarios in which it increases the share

of renewable energy in the energy supply mix, to meet this new target (City of Fort Collins, 2015). The importance of electricity utility ownership to GHG emissions reduction has led the City of Boulder to adopt the policy goal of "municipalization", an effort to convert the utility to municipal ownership, as one of its key clean electricity strategies (City of Boulder, 2017).

Localities also deploy some regulatory instruments for climate protection. One of the common ways that localities have exercised their jurisdictional authority is by upgrading the building code to stronger energy efficiency standards for new constructions and old building retrofits. However, in some states, localities cannot adopt building code requirements that are more aggressive than the state code. In addition, local governments can pass ordinances to control the type of infrastructure that is erected in their jurisdiction. The City of Portland passed a resolution in 2015 to control the construction of fossil fuel infrastructure in the city. The City of Baltimore introduced a new zoning code under the TransForm Baltimore plan, which is expected to bring about pedestrian-oriented, mixed-use development, in the effort to build a compact city for shorter travel distances between places (City of Baltimore, 2013).

The regulatory powers of local governments are limited. Even in cases where such powers exist, the feasibility of applying them comes into question. Incentives therefore comes as one of the handiest policy instruments deployed in local climate action. The U.S. Department of Energy's (DOE's) Energy Efficiency and Conservation Block Grant (EECBG) program has been instrumental in the use of incentives by localities in their climate mitigation efforts. The City of Burlington has a nationally recognized energy efficiency program which provides incentives in the form of grants and funding for Burlington-based entities, such as residents and businesses, among others, to reduce energy use in buildings (Burlington Electric Department, 2016). Some localities, such as the city of Baltimore, offer free weatherization to low income households (City

of Baltimore, 2013). Low or no interest financing is also used to incentivize consumers to change their home appliances to more energy efficient ones.

The development of partnerships with other local players is yet another enabler of local climate protection effort. Local governments form partnerships and negotiate with private entities to establish agreements on specific courses of action on climate mitigation. The City of Cincinnati's climate action manager emphasized the effectiveness of public-private partnership to their climate protection efforts, with an example of their bike share program, carried out by the Green Umbrella, a nonprofit organization that organizes a lot of sustainability actions. Local governments also take a regional approach to transit planning, by partnering with surrounding localities, as a way of maximizing transit infrastructure and reducing the financial burden on individual local governments.

> So, I mean, having some strong community alliance has been incredible for any citywide policy. That is one thing I didn't realize coming into the job; how important that was, and now they (partners) are a very huge assert. (LCAP Manager, City of Evanston, IL, January 12, 2018)

In the process of updating the City Hannover's climate action plan, the Lord Mayor of Hannover invited the big energy consumers to be part of the process. They formed a working group and over one year discussed specific measures and the financial logistics necessary for meeting the city's new GHG reduction goal of 40% below 1990 levels by 2020. Based on the request of the private actors that were involved in the initial partnership, a climate alliance between the city and the private industries was formed and has been running for the past 8 years. Just as with many other local governments, the climate manager explained that it is important partnering with the private sector and making them a key part of the process because the city, for the most part, cannot force private entities to take actions to reduce GHG emissions.

Trans-municipal networks are almost organic to local climate action. Most localities got involved in climate protection in the first place, by joining networks of cities committed to acting on climate change. Examples include International Council of Local Environmental Initiatives' (ICLEI) Cities for Climate Protection (CCP) program, the US Conference of Mayors Climate Protection Agreement and the C40 cities. Besides galvanizing localities to commit to climate protection, trans-municipal networks also provide practical support to localities. ICLEI is cited by local climate action managers as one of the most valuable resources in the initial development of their LCAPs. The Urban Sustainability Directors Network (USDN) is cited by most climate protection managers in the United States as the trans-municipal network that offers them the most value, due to the opportunities it presents, such as peer-to-peer learning, peer-to-peer collaboration, best practice information sharing and moral support.

> Apart from the cluster initiative, there are also other networks that promote the transfer of knowledge in the region and push forward its alternative energy strategy: It's not just the "WEE 100%" that is committed to the political goal of providing energy from renewable energy sources. The "Klimapartner Oberrhein" (Upper Rhine Climate Partners) actively promote climate protection and create an awareness and knowledge of energy-saving opportunities through information, networking and further education. (City of Freiburg, 2017) p.5

Even though in developing their plans, local governments take into consideration areas they can exercise authority over, they also act to influence activities in other tiers of governments, through policy advocacy, to enable their own efforts. One of the strategies to circumvent jurisdictional barriers is lobbying state or federal governments to pass enabling legislation. For instance, the governor of the state of Oregon issued an executive order in the fall of 2017, directing the update of the state energy code, partly through the lobby of the City of Portland. It is however not always the case that local governments will be successful in lobbying

state governments. For instance, the city of Austin's climate action manager asserted that they stay completely off the radar of their state government due to its highly conservative nature.

Keeping community members informed, through outreach and engagement, about the issue of climate change and involving them in the decision-making process emerged as one of the important enabling instruments in local climate protection. LCAP managers reported that they get a lot of value from working with their stakeholders, in terms of what they contribute to the content of their plan. Community engagement is also said to build the capacity of community members, most especially, low-income communities and communities of color, who in the past, have been largely left out of most of the climate change activity. The climate action manager of the City of Portland gave an example of how a lot of the communities who, five years ago, would have been absent from the conversation on climate change, are now significant agents; to the extent that a lot of them went down to Salem to lobby for the carbon cap and trade bill that was being considered. In some localities outreach and engagement has led to an acceptance and ownership of climate action practices across multiple local government departments; the transportation department, the parks department, housing bureau, among others, take the LCAP as theirs, and their responsibility for implementing it.

Sometimes, policy goals are achieved through market-based activity. What has been happened in the solar industry over the last five years is a good example. Instigated by local policy, market forces have made solar a realistic option for residential and commercial energy. Local climate policymaking from the outset recognized the benefits of solar technology, but certainly didn't have control over the market. The private lending market has also been a source of financing for local climate projects. Solar workforce increased by 168% in the past seven years in the United States (The Solar Foundation, 2018).

7.4 Challenges of LCAPs

The phenomenon of Not in My Backyard (NIMBY) has emerged as one of the challenges of local climate protection efforts. Although there is generally no resistance from community members in the process of developing and rolling out LCAPs, resistances, however, have emerged in the implementation of specific actions. The idea is that people are generally supportive until there is a specific action that impacts them more directly. For instance, in the case of the City of Portland, the climate action manager recalls that there was generally support for building for greater density until new, bigger and taller apartment buildings were erected around some neighborhoods that have been around for over 100 years, then resistance ensued. The residents didn't want to see their neighborhoods change; they want the denser, compact city in theory, but when it happens on their street, they are resistant to that change (LCAP Manager, City of Portland, OR, January 7, 2018).

The nature of climate protection is such that it requires action in all aspects of human life, which is a huge challenge. The climate manager of the City of Cincinnati pointed out that whenever there is a new project, big or small, such as the renovation of a school building, or the construction of a whole new neighborhood, making sure elements of climate protection are catered to among other priorities is challenging.

Securing a meaningful community-wide participation in climate protection can be an enormous challenge. It is difficult to convince people to take actions towards climate protection, or that there is an economic justification for the local government to spend money on such measures. Responding to the City of Fort Collins climate manager's comparison of the difficulty of getting a significant community-wide interest and participation in climate action to trying to convince people to save for retirement, the climate manager of the City of Columbia added: "The

thing about retirement is that you know it's going to happen, but even with climate change there are still so many people who doubt this climate change thing, they are like, I will be dead" (LCAP Manager, City of Columbia, SC, January 29, 2018).

Just as with many other policy issues, finding and maintaining the funding for climate protection is a challenge experienced by all local governments, although at varying degrees. The initial cost of developing the LCAP alone has prevented some local governments from taking up climate protection. Even when localities are able to get past the initial cost of developing a plan, how long their plans can run and how extensive their programs will be is usually incumbent on the availability of funding. For instance, the city of Hayward was able to secure funding from the Regional Air Quality Management District to hire a consultant to develop their first climate action plan, but once the plan was adopted, they didn't have any funding to implement it until the federal energy efficiency block grant was introduced. Considering other competing social issues such as housing for low-income individuals and poor public infrastructure, it becomes difficult for instance, making a case for the city to provide funding to hire new staff for climate action.

Closely related to the problem of funding is inadequate staffing. Climate action managers overwhelmingly complain about the lack of adequate staffing to carry out the actions in their plans. In some cases, interns are hired to develop the LCAP and part-time staff run it. In other instances, city staff in other departments who are already overwhelmed with their regular duties are asked to work on climate protection measures.

> We only have part-time workers here at the climate protection, but we have a lot of work to do. For example, with the electric vehicle strategy, we have no personnel. Because Hannover is growing, we have a lot more to do in infrastructure and our work changed extremely because of the building sector; because housing associations are building houses. Houses that we have to produce energy concepts for settlements, so this is really a challenge. (LCAP Manager, City of Hannover, January 23, 2017)
> On the part of city staff that I am asking their help with these initiatives and they already have 120% of their time for their own work. So this is sort of being asked on top of what

> they already are doing and, so, it is always a challenge because, many of the initiatives that are in the plan that I work on, I can't do directly myself, I have to rely on my co-workers to help me and they just are supper busy, and Mountain View has been fairly short staffed for quite a while. (LCAP Manager, City Mountain View, CA, February 17, 2018)

There are activities and actors within the jurisdiction of localities that are critical to climate protection which the local government has no power to control.

> In our GHG plan we recognize that we probably won't make our target if the federal and state government do not take action because there is so many things, we have no control over. We can't control what kind of vehicles people buy, how fuel efficient they are, that's really got to be federal standards or the car companies themselves deciding that there is a market value for that. (LCAP Manager, City of Austin, February 9, 2018)

> I think the important thing is that we need better framework and legislation with more power, because we do everything we can do at the local level, for instance, energy supply, supporting people, advice campaign, we do a lot of things in the city administration by our own by for example, electric vehicles and so on, that we can show that we are doing something, but we need more support from the federal government in terms of stricter regulations. For example, for traffic which is also a big part in Germany that has a lot of emissions, so the building sector, the traffic sector and so on (LCAP Manager, City of Freiburg, February 28, 2018).

Localities in Dillon's Rule states are largely disadvantaged when it comes to regulatory power, as their powers are assigned to them by the state government. In North Carolina, local governments cannot, for example, increase their building code for more energy efficiency; it must be passed at the state level. A city such as Durham cannot require building owners to benchmark building energy use, or require buildings be built solar ready.

An investor owned utility situation can be a challenge to local climate protection efforts, as it makes it difficult to increase the renewable energy mix at the utility level. The argument is that these utility companies are beholden to their investors and are therefore reluctant to make changes for fear of losing profits. In some cases, these investor utilities work against the decentralization of energy supply which will make it possible for businesses, factories,

campuses, and households to generate their own electricity by, for instance, installing rooftop solar photovoltaics, community-supported solar gardens and wind turbines.

> My understanding is that Alameda municipal power has not been making it easy for Alamedans to put up solar and do other kinds of distributive generation. I think if anything they have dug in their hill a little bit about that. (LCAP Manager, Alameda County, February 5, 2018)

One of the central arguments in favor of climate action at the local scale is the idea that it is the scale of the everyday material practices of humans and, also, physically, it is the closest to businesses and industries. However, in the practice of local climate mitigation measures, it has been realized that the physical location of an industry within the confines of the local government's jurisdiction may not necessarily make its participation in local climate mitigation efforts easy. The multinational nature of most industries means that the decision-making apparatuses are often at their headquarters, which may be located in distant places; this has been observed to hinder the ability of localities to get industries aboard local climate protection efforts.

Another important problem raised is the lack of accurate and good data at the local level to inform climate protection decision making. Not having an ongoing, consistent and uniform metric and data gathering methodology makes it a challenge tracking and reporting GHG emissions. This is not only a problem in terms of the ability of localities to track their own progress, but also, to compare with other localities to have a sense of relative progress.

> Well the biggest issue with climate action is really having all the data that is consistent. Like ICLEI created a protocol on how to build your community GHG entry and, so, that is so critical that community has a baseline and they know where all the emissions are coming from. You have to know where your emissions are coming from before you can put programs and policies in place to help reduce emissions. I think having consistency for communities to develop their inventories so that you can compare apples to apples is important; there has been a real problem with metrics and data over the decades. (LCAP Manager, City of Boulder, January 22, 2018)

The various geographic regions of the United States have different cultures and overall worldviews that impact their political attitudes. Some climate protection managers contend that their localities are in regions or states where environmental concerns are generally considered as non-issues, and, for that matter, they are unable to generate a high level of appeal for their climate protection efforts. The Midwest is particularly mentioned as an area where environmental and climatic concerns aren't always at the forefront, unlike the west coast.

> Just the fact that being in the Midwest, in this area, environmental concerns and climatic concerns aren't always at the forefront, so I think if you are in a different part of the country I think there is a tendency to appreciate some of these objectives a little more than other areas of the country and we are probably in the area of the country where we haven't had a lot environmental impact. (LCAP Manager, City of Creve Coeur, MO, January 24, 2018)

The science of climate change is quite complex, and, in addition, it has been hugely politicized in the US. Hence, crafting a message that promotes the need for action, that reaches individuals of all walks of life within the locality has been identified as challenging. There is no analogy or quick statement that you can say about climate action that is able to tell business owners how getting involved in climate protection impacts their bottom line – why does it make business sense to do some of these things? Even in situations where highlighting the co-benefits of climate action is deemed as a powerful way of communicating climate change to generate support, there are challenges due to its historical politicization.

> Then again you are talking about communication with the partners and local people. What I can tell you now is that the population is very sensitive, when you talk about ecological, biological, and climate protection, they really don't want to talk to you anymore. So, of course, you need to change the way you speak with the people, and that is the biggest challenge with every group, with every milieu, or target area, or every partner. You have to know what is the language that they understand; shall we talk about money or children or love for nature or birds? And, then, that is what you are going to talk about. That is why I say across all sections; the biggest challenge is having your citizens and your partners and your industry wanting to work with you and make plans together. What I find even more important is, this is actually one of the topics that we always discuss, what are we going to talk about? are we going to talk about money? or

> Being independent? Create your own energy so you are not dependent on the grid? What are the topics that people react to? I think one of the topics is quality of life. You can talk about how the transit system is good for clean air for breathing. So, at the end, if you talk about quality of life, you reach a wider amount of people, but you have to be able to identify what quality of life means for each target group (LCAP Manager, City of Freiburg, February 28, 2018).

> I just went and visited a community where climate change is still sort of a thing you cannot really talk about publicly. You know there is a lot of inks around it and there is a lot of communities in a lot of cities where they know that the work is important and there is a lot of benefits that come out of it, but that the issue of climate change has been politicized. That it is hard to sort of packaged things up as a climate plan and have it be successful and, so, I think one thing that would be important is first, like I said, all the things in our climate plan, reducing GHG, is important to us, but it is not the reason we do the work. We do the work because it helps us create a community that we want to live in and, so, I think that it is important to remember that, that is really an important reason to do this work. I think sometimes cities may shy away from doing this work because they think about the politicized issues around the topic and not the fact that people in their community want less congestion, and they want more opportunity to get outside, and be more healthy, and they want to save more money on their energy bill, and they want to live a conformable house that is quite, and so, figuring out how to really understand all the benefits that come along with this work can help. I think that that framing is important; even here, when we go out to the public, we rarely talk about climate change, we talk to the public about all those other benefits. Even if you looked at the city's website you wouldn't see climate change on there very often. Even here, locally, it's not how we frame our work (LCAP Manager, City of Portland, OR, January 7, 2018).

Making the decision to act on climate change at the local level is ultimately the preserve of political leaders. This means that in the absences of strong political support from local politicians, there wouldn't be any local climate action. For example, the city of Baltimore had been planning to put up a public transport system that would go through many of their low-income neighborhoods, where a lot of people don't have access to cars, a few years ago. However, when a new republican governor was voted into power, he nixed it (LCAP Manager, City of Baltimore, February 2, 2018).

Some localities are experiencing rapid population growth, which is putting their GHG emission reduction strategies out of balance. Most cities welcome new residents and businesses

every year, which means, new buildings, new streets, and new housing subdivisions are added, driving up GHG emissions.

> So, we have the problem that many people come to Hannover, so in ten years we grew about 30,000 people. That is a lot of infrastructure, building a lot of flats to house all these people, so it is not good for our GHG audits, because we are growing, in addition to the difficulty of change of lifestyle. Yes, we did so much, but the city was growing, so the economy was growing, the number of cars was growing, the distances that people went by car was still growing. Even though we had a rather good public traffic system, nevertheless, traffic was getting more and more at that time (LCAP Manager, City of Hannover, January 23, 2017).

> I mean there are a lot of factors, but the single easiest thing to explain that is, in the last six years, Mountain View has been adding so many residences and businesses; it's crazy how much development is going on, and every time there is a new resident, or employee in Mountain View, that is more GHGs (LCAP Manager, City Mountain View, CA, February 17, 2018).

Another challenge, particularly experienced by cities that are advanced in their climate protection, is the problem of spatial inequality and social exclusion. First, the green utopia that is expected of such cities eludes low-income households and communities of color. The benefits of easy access to public transit and walkability to places, which are often associated with sustainability cities are often exclusively enjoyed by privileged communities. There is also the phenomenon of 'environmental gentrification,' (Checker, 2011) where the attraction of the concept of urban sustainability and the associated planning has led to the displacement of low-income households due to rising property values.

7.5 Funding LCAPs

Securing sustainable funding is one of the chief challenges of local climate protection efforts. This discussion intends to demonstrate the inchoate nature of local climate protection funding and to also bring to light the diverse sources and funding mechanism employed by localities in their climate protection efforts. The funding sources identified in this discussion are not expected

to be exhaustive and are not necessarily utilized by every single local government embarking on climate protection.

The federal government has been one of the sources of funding for local climate action. As a response to the 2007/2008 recession, the American Recovery and Reinvestment Act (Recovery Act), a stimulus package meant to revitalize the economy, was enacted and signed into law by President Barack Obama in February 2009. Through this act, an amount of $3.2 billion was appropriated to the U.S. Department of Energy's (DOE's) EECBG program for cities, communities, states, U.S. territories, and Indian tribes, to carry out energy efficiency and conservation programs that will ultimately create jobs (U.S. Department of Energy, 2017). The EECBG stands as the highest nationwide source of funding for subnational energy efficiency and renewable energy development programs in U.S. history (U.S. Department of Energy, 2017). For instance, the city of Evanston got $749,700 to carry out a variety of projects (City of Evanston, 2012).

Some state governments, through their various departments, offer funding opportunities to support local climate actions. The California Energy Commission offers financing up to $3 million per application and a competitive grant program of $30 million for cities and counties for energy-saving projects (Institute for the Local Government, 2015). The City of Evanston received $600,017 in rebate money from the state of Illinois' Department of Commerce and Economic Opportunity, through their Illinois Energy Now program (City of Evanston, 2012).

While the City of Columbia's climate protection manager pointed out that taxation as a way of generating funds for projects isn't a popular thing in the South, local governments in other parts of the country have been successful in levying their citizens for funding climate action. Customers of Vermont Electric pay a monthly energy efficiency charge on their

electricity bills towards funding energy efficiency programs (City of Burlington VT, 2014). For the city of Fort Collins, a 2% fee is levied on utility bills to fund energy efficiency and renewable energy programs (City of Fort Collins, 2015). In November 2006, the citizens of Boulder, voted in favor of authorizing the city council to impose an excise tax on residential, commercial and industrial electricity consumers for the purpose of funding climate protection programs (City of Boulder, 2017).

Utility companies also offer funding for local climate protection through incentives such as, rebates, and expert technical support. For instance, PG&E matched the funding received from the EECBG program by the city of Hayward, with energy efficiency incentives for businesses and home owners (City of Hayward, 2013). The City of Charlottesville, VA, funds its climate protection program from the utility budget (City of Charlottesville, 2018).

More of a funding strategy than a source of funding is the approach adopted by the City of Portland, where the projects for climate protection are spread out to various city departments. Portland's climate protection action emphasizes the co-benefits of GHG reduction programs and, for that matter, many of the actions and programs are considered as things the city should already be doing for the non-carbon related benefits, such as saving money, improving health, and enhancing the overall livability of the city (City of Portland Oregon and Multnomah County, 2017; Multnomah County, 2015). The various city departments are then expected to allocate resources from their annual budgets to fund any climate protection related actions that fall within their areas of responsibility.

In some cases, there are regional organization that provide financial support for local climate protection programs. The City of Creve Coeur got some funding from the East-West Gateway Council of Governments (EWG), a regional planning organization, for some of its

climate protection efforts (City of Creve Coeur, 2015). The city of Hayward's funding for the development of its first climate action plan came from a grant from the Bay Area Air Quality Management District – the Air District (City of Hayward, 2013). The Southern California Association for Government also has some funding for local projects from which the city of Hayward has benefitted (City of Hayward, 2013).

Many financial institutions offer financing for green projects which local climate protection could benefit from. However, what has become known as the Green Bank – public-purpose capital entities with the goal of using public funds to leverage private capital in investments in low carbon and climate resilient infrastructure – has become another funding avenue for local climate protection (OECD, 2017). Through its Green Bank, Montgomery County is trying to leverage at least 10 times in private capital from its public spending on green projects (LCAP Manager, Montgomery County, MD, January 31, 2018).

The Mayor's budget and the general fund are other sources of funding local climate protection. The cities of Cincinnati and Burlington started their climate mitigation programs with monies from the mayor's budget (City of Burlington VT, 2014; City of Cincinnati, 2013). In the case of Miami-Dade County, the general fund has been the main source of funding of its LCAP (Miami-Dade County, 2010).

Funding for local climate action plans could also be sought directly from the community members. The City of Evanston, through its sustainability partnership program, has done exactly that. The program gives students the opportunity to gain experience in climate action work, through volunteers and internships, saving the city thousands of dollars in work hours. The city also organizes an annual fundraiser, called the Green Ball, to support the Evanston Ecology Center (City of Evanston, 2012).

7.6 Conclusion

The mixed performance in GHG emissions reduction of LCAPs is not surprising given the mixed enabling and challenging conditions that impact climate protection efforts. These enabling and challenging conditions vary across localities. In fact, there are localities that, overall, are unsuccessful in reducing their GHG emissions, but have enabling conditions and instruments in certain areas that can be emulated by other localities that have been generally successful in reducing their GHG emissions, and vice versa.

The major highlight of the study is that local climate protection efforts have the potential of bringing about meaningful reduction in GHG emissions. In fact, the localities that recorded decreases in their GHG emissions either met or exceeded the Kyoto requirement for the United States, which implies that if all localities in the country were taking similar actions, their individual contributions, fitted like a jigsaw puzzle, would make up the national GHG emissions reduction requirement for the United States. Evidently, not all localities that are actively pursuing mitigation measures have high enough ambitions or enabling conditions to be successful in reducing their GHG emissions; capacity is not uniform across all localities.

Although the "geographical-institutional arrangements" (Swyngedouw, 2004) of the locality presents a practical medium for climate protection to be initiated, the presentation of the 'city'/ 'urban'/ 'local' scale as though it were a uniform platform across the globe, with already existing 'willing' and 'capable' attributes to deliver the goal of the Paris Accord of keeping global average temperature increase below 2□ C, is untenable. While localities have the potential of reducing their GHG emissions, in the practical sense, the promise often touted by the discursive deployment of the 'local', 'city', 'urban' etc. as the curative platforms of global climate change may be an overstretch.

8 Jurisdictional Capacity: Scale Production, 'Scales and Jumping' and Networks Construction in Local Climate Action

8.1 Introduction

Materially, actors have adopted the scale tiers of the state in the effort to mitigate climate change. Actors recognize the allocation of authority to discrete and hierarchically stack state bureaucracy in their design of policies and choice of instruments in their climate protection efforts. However, actors do not remain confined to these scales, but reach out upward or downward in pursuit of their political goals – a process referred to by Neil Smith (1992) as scale jumping. Also, in reality, the spaces of climate protection are much broader than suggested by the organization of actors and processes into the vertically stack spheres of state authority; there are lateral spheres of authority made up of both state and non-state actors whose actions are integral to the given political struggle, in this case, climate protection. Hence, networks of interaction are constructed as part of the spatial politics of climate change governance.

This chapter examines the dynamics of local climate action using insights from the theories of spatial politics, particularly scales and networks. It examines the scalar arrangements, and "the specific processes and technologies" (Miller, 2009, p. 63) involved in their production, deconstruction and reproduction (Bulkeley, 2005). It discusses the reasons why climate change governance is configured at the local scale; the areas of climate change protection action that are considered as existing within the domain of the local scales, and those considered as within the domain of other scales, as a demonstration of the scale practice. In that, actors determine what should and should not belong to a given scale category. In addition, the deliberate scale jumps, interactions across scales and the construction of new tiers of authority (scale category) in-between scale categories to accommodate activities that are seen to be beyond the authority of, or

not captured by any of the categories of the adopted scale are also discussed as part of this scalar practice. Some scholars have argued that there is an artisanal dimension to scalar practices and so they refer to all the scalar activities associated with given political struggles as 'scalecraft'(Fraser, 2010; Papanastasiou, 2017).

The second section of the chapter discusses the lateral deliberate networks of interactions taking place simultaneously with the scalar practices as part of the broader space of local climate action. These networks that comprise both state and non-state actors, in the case of local climate protection, are discussed in the context of their role in circumventing the barriers of constructed scales and their contribution to the processes of the local climate mitigation efforts.

8.2 The scale practices of local climate protection

The pioneering literature on the concept of geographic scale came from the political economy school of thought – the materialist perspective. This perspective suggests that capitalism has a universalizing effect, such that the sociospatial interaction of the capitalist production system has produced a scaled world – urban national and global scales. In such theorizations, there is an effort, albeit a struggle, to compartmentalize every social agent and their activities into their respective scales, without any vagueness or inconsistencies. An example is Neil Smith's functional approach to scale; he argues that the urban scale is the realm of collective consumption of public services, whereas the regional scale is the domain of production and distribution of goods (Smith & Dennis, 1987; Smith, 1992). Smith discusses scales and their constituents as thought the same type of phenomena can be found at the same scales across the globe.

In this dissertation however, I have argued, through a critical review of some of the pioneering discussion of scale, that geographic scale has been deployed as an analysis of scale practices. Essentially, the empirical analysis of scale production and the politics of scale, by geographers, have been analyses of the scale practices of actors in given political struggles. Hence, scale should be viewed as a practice, and the scale concern of researchers should be in terms how actors are practicing or using scale in the process of addressing social problems or influencing social change.

Actors in the pursuit of social and political change invoke scale discursively to gain dominance and control over social and political space, or materially as a platform for material practices. As a result, what geographers or scale analyst should be concerned with in these circumstances is the scale practices of actors and their material outcomes. In the climate change mitigation struggle, actors engage in scale practice by adopting the scaled tiers of the state and assigning reasons why climate mitigation should take place at the given scale.

8.2.1 Why localities take up climate action

As part of the analysis of the scale practices of climate change governance, the study sought to ascertain, first hand, from climate/sustainability managers why they perceive climate protection as something that should be acted upon at the local scale. Five main reason emerged from their responses: sense of responsibility; recognition that there are local benefits from climate action; the ability to influence large GHG emitters due to their proximity to them; unique local conditions and; lack of action at higher tiers of government.

There is the recognition that the problem of climate change is global in nature and, for that matter, all sectors of society are responsible for acting to curtail it. The reasoning is that local

governments are a significant tier of state power and therefore should play an instrumental role in addressing climate change. It is strongly believed that the local scale can make a significant difference in climate governance since GHG emissions, the main cause of anthropogenic climate change, takes places everywhere in the world.

One of the key arguments in favor of taking action on climate change at the local scale is that besides the core goal of reducing GHG emissions towards climate change mitigation, there are other benefits that could accrue to individuals, businesses and the community as a whole. "I think there was some recognition that there were a lot of other benefits to reducing carbon emissions" (LCAP Manager, City of Evanston, IL, January 12, 2018).

> There is a tremendous amount of financial savings and efficiencies that come as a result of strong environmental programs and, so, we rip many benefits from this. So, when the federal government made some decisions not to support this kind of work (climate action) anymore, we see no reason not to move forward with the things we want to do. I will say every city that I am familiar with in north America that was previously committed is still committed, and it really informed our resolve to do this work. (LCAP Manager, City of Roanoke, VA, January 11, 2018)

All phenomena, especially the physical ones have absolute locations in space. As a result, every GHG producing agent is situated in a locale. There is therefore the view that because local governments are the closest institutional authorities to residents, industries and businesses, they are uniquely positioned to influence the behaviors of these agents towards climate protection. The idea is that they know the individual GHG producing agents located within their jurisdiction and can therefore directly target the large emitters and, subsequently, engage them in projects that will lead to emissions reduction. The city of Hamburg's voluntary GHG emissions reduction agreement with industries located within the city is one such success stories.

Although the sources and impacts of climate change are not spatially confined, the internal conditions of places influence the success or otherwise of mitigation efforts. The idea is that

every locality has some unique conditions that may require actions to be tailored to such conditions. Some of these internal conditions may be political, economic, social or physical. Due to these different internal conditions, the messaging and technical mechanism for climate protection will have to vary from one place to another. The following statement from the climate change manager of Miami-Dade County, FL, will suffice:

> I think in our community we have a strong history of doing things at a more local level for a couple of reasons. One is like we have local conditions that are very different from other parts of the country, so for example, our drinking water, we have an aquifer, it is called the class one aquifer, because really, the amount of treatment that is required is very little compared with other drinking water supply, our aquifer is very high quality, but at the same time it is very vulnerable because our water table, the level of the water with respect to the surface of the ground, is sometimes like three feet below the surface of the ground, so it is very easy to contaminate it, and so we have a lot of local regulations to protect that ground water resource that really will not be relevant at a federal level. Another example is that we have a lot of hurricanes and so we have building requirements for our construction industries that they have to meet certain wind velocity that wouldn't be relevant pretty much anywhere else in the country either. So, we have a history of understanding that we have some very specific conditions here that kind of given us some history of taking more local action, maybe, than other communities (LCAP Manager, Miami-Dade County, FL, February 9, 2018).

It is not surprising lack of federal level action, emerged as the most stated reason, by local climate action officials, why climate protection should be taken up at the local scale. It would be recalled that the first wave of local climate plans adoption took places in the aftermath of the Kyoto Protocol coming into force in 1995 without the United State. Local climate officials particularly emphasized the different attitudes of the Obama and Trump administrations towards climate protection. While the Obama administration was viewed as more progressive in its attitude, the Trump administration took a more antagonistic posture. The Irony, however, is that respondents felt that the Trump administration, through its antipathy towards climate change, has, in fact, energized local governments to even take more action. The administration's act of pulling the United States out of the 2015 Paris Accord on June 1, 2017, is believed to have

encouraged cities that were already taking action to do more and caused others who were previously not concerned about the issue to take it on.

> Our mayor currently is not particularly focused on that kind of work but because of what happened at the federal level she is joining right in and she is interested in what is going on, so you know, that is the positive of the negative on that (LCAP Manager, City of Baltimore, February 2, 2018).

8.2.2 Inherently Local Areas of Climate Action

Part of the configuration of the scale of climate action is the determination of the phenomena that would be included or excluded as legitimate areas of action in the given scale. Adopting the scale tiers of the state as the configuration of local climate action, actors, particularly, local climate action planners identify specific areas and design programs of action, usually phenomena presumed to be within the influence of the local state authority. In other words, the process of developing LCAPs involves selecting tools for climate action targeting areas that are viewed as within the jurisdiction of the local scale. This section provides the responses of local climate action official about the areas of climate action that are fundamentally local.

Actions related to spatial planning are deemed to be fundamentally local. The idea is that planning shapes people's immediate lived environment and for that matter they should have a greater say in decisions on issues related to changes in the immediate environment. Since local government is the closest state authority to the individual, it should oversee decisions on such matters. Local climate action managers therefore mention energy saving standards such as building code, energy code and land use as important local level levers for climate protection.

> Well like our flood plain regulations are local regulations, right? our developers and our residents have to abide by. Those are very important, and we have very strict building code, we are following the international green construction code for our building so that

> is fairly a strict code. We do hope to do more codes work moving forward with energy. (LCAP Manager, City of Baltimore, February 2, 2018).

The legitimacy of climate change as a pressing social problem that requires immediate attention in terms of time and scarce financial resources against other competing issues is yet to be established. One of the most important ways of shifting climate change from the position of a non-issue to a position high up the political agenda is the ability to frame the issue in a manner that will engender public appeal. Also, climate change as an issue is complex and not easy to comprehend without proper education. These factors, coupled with the fact that a significant aspect of dealing with climate change is to engender social and behavioral change, requires significant effort in the transfer of knowledge and exhortation. The argument is that local governments have better contact with people on the ground and, for that matter, it is easier for them to engage with residents and businesses.

> We are the ones that have the relationships with the businesses within our communities, we are the ones that are working every day to improve the quality of life that our residences enjoy; the community, its where we are from right? so I think that those individual actions that people can take and the relationships needed. (LCAP Manager, City of Fort Collins, CO, January 26, 2018)

The sector of human endeavor that contribute the most to GHG emissions is mobility. As a result, one of the strategies to deal with emission from the mobility sector is to build compact neighborhoods, so that people can use nonmotorized means of transport to run their day-to-day errands, in order to reduce VMT. Designing and building compact urban neighborhoods is generally believed to be a local level responsibility.

> You know local governments control land use policy so that is huge and generally control a good portion of the transportation system, so making big decisions on how well people can get around, where they need to get around without contributing to climate change, either walkability, bike paths or density or public transportation, are decisions that happen at the local level for the most part. Durham has been doing a lot of urban infill and that's good, reusing of old building instead of tearing them down and building something else there, obviously there is a lot of impacts and emissions related to

> construction and construction waste and material and all of that. So that's the thing we do at the local level. (LCAP Manager, City of Durham, NC, January 29, 2018)

If energy utility companies would shift from fossil fuels to renewable energy, most of the climate mitigation actions will not be necessary; however, this would be a tall order. Utility ownership has therefore been found to play a significant role in the success of local climate mitigation efforts. While some localities own the companies that supply their electricity, others are supplied by companies under investor ownership, which activities are controlled by a state level institution. The ownership and control of the energy utility has featured prominently as an area that needs to be controlled by the local government for better success in climate protection.

8.2.3 Areas of Climate Protection Suited to other tier jurisdictions

Scaling is fundamentally an act of inclusion and exclusion. There are several climate protection policy areas that are considered as either more suitable for other tiers of government or are considered better suited for local action but are within the jurisdictional power of other tiers of government.

Determining the building code standard is one action area that actors have assigned to different tiers of government. Climate managers suggest that strengthening of the building code at the state level is one of the important things for local government climate mitigation efforts. Although actions related to building code are more suitable for local action towards the goal of GHG emissions reduction, there is recognition that the local government, in most cases lacks the power to enforce stricter codes than that determined by the states.

> Here in Oregon we have a state energy building code and cities can't adopt any requirements that are more aggressive than the state requirements, so we are limited by the state, so unless the state adopts more aggressive energy performance code, we are limited in what we can accomplish here locally and so we need the state to do that. (LCAP Manager, City of Portland, OR, January 7, 2018)

This revelation adds to the fact that constituents of a given scale are not universally defined, and that it is only through scale practice that constituents of the various scale categories are determined. Although actors view determining the building code standard as something more legitimate for the local government to do, in most cases, that authority is not assigned to it.

Another area where climate protection managers think sates should act upon is increasing the renewable energy mix of the locality's energy sources. The electric and gas utilities that serve most localities are governed by a public utility commissions, which is a state level agency. The conduct of the utility companies is controlled at the state level, so in terms of madating the utilities to increase their renewable energy, the directive has to come from the state level.

> So, we have our utilities, and there are some state regulations that require our electricity utility to become lower carbon over time and have more renewables and so that is something that the state government can do. We can encourage our utilities to shift their power sources, but we can't control that, so that is the area we rely on the state and those utilities themselves to be headed in the right direction. (LCAP Manager, City of Portland, OR, January 7, 2018)

Also, rules on net-metering and community energy aggregation are controlled at the state level, so if even the local government encouraged individuals and gave incentives for the growth of renewable energy, such as the installation of PVs on roofs, the success of such efforts will be incumbent on state rules.

> In North Carolina, we have pretty much a monopoly, duke energy, for our electricity and most of us are pretty stuck with what they give us. We don't have a lot of control over the energy mix, and it's true that certainly private companies and individuals could chose to put solar panels on their homes for example, a lot of that is based on financial situation and tax credits and things that we don't set. But also, here you have to sell your electricity to duke energy and so you are still beholden to the policies they have on how much they are going to pay you, how much customers they are going to take on, so they might reach some limit and say we don't need any more solar energy and they are not going to pay anybody else to produce it. Even though theoretically, that is an individual decision

> (installing solar panels or private homes and businesses) and the city could theoretically encourage it, it is a little bit harder to do on the local level here than to do in other places. (LCAP Manager, City of Durham, NC, January 29, 2018)

Local climate mitigation actors consider the Corporate Average Fuel Economy (CAFE) Standards as very important to their efforts, but evidently, the control is beyond their jurisdiction. The following quotes of the climate action managers of the cities of Portland, and Austin sums up the importance of CAFE standards for the success of LCAPs, but which needs action from higher tiers of government.

> So, there are some things that without state or federal action, there is no way that we are goanna be able to achieve our local goal, an example of that might be fuel efficiency standards for cars. Without federal requirement to improve the efficiency of cars on the road it is going to be really hard for a local government to make significant progress on transportation, Carbon emissions. There is only so much we can do through transit, land use and transportation planning; we need the cars to be more efficient. (LCAP Manager, City of Portland, OR, January 7, 2018)

> There are car dealerships everywhere and people just go buy cars from any dealership, so as long as they are all selling gasoline vehicles that get poor mileage, there is not a lot that the city can do about that. We can try to make the city denser, try to get people out of cars. The reality is that people are going to own cars and drive around the city, that is the area where it is essential, we have federal level direction and mandate and requirements for vehicle manufacturers so that when people go to the Chevy dealership, they have good options that will help in reducing emissions from cities. That is the area that I think it is essential that we have help. (LCAP Manager, City of Austin, February 9, 2018)

Funding from the state and federal levels have proven to be vital to climate protection efforts, both in terms of enabling localities develop their first plans, as well as carrying out specific climate protection actions. LCAPs managers argue that local state governments have very limited revenue generating potential and, as a result, have limited budgets but with a lot of pressing issues to address. In addition, the benefits of climate mitigation actions are not going to accrue to only their locality; hence, they opine that the state and federal governments should fund climate protection efforts. Some Climate managers cite how vital the federal energy efficiency

funding from the stimulus package in 2009 was for them to get a lot of their climate protection programs going.

The federal solar tax credit has been found to be hugely successful in rolling out solar; "so I think that model of encouraging the behaviors you want to see really works" (LCAP Manager, City of Cincinnati, February 5, 2018). There is also the position the federal or state should provide financial support for the capital-intensive climate mitigation actions such as building retrofitting and large-scale transportation infrastructure projects.

> Here we want to build a light rail system between Durham and Chapel Hill, and that's all great. We passed a sales tax and it was overwhelming approved to pay for it and have sites located for the stations and we are doing transit-oriented development, planning and zoning around the stations, but we are still dependent on the state and federal government for part of the funding otherwise we will never be able to build that train. So again, that is one of those things not that we can do it all alone, but we can try to do the best we can. (LCAP Manager, City of Durham, NC, January 29, 2018)

In February 2009, the Obama administration tried to introduce the cap and trade system to control greenhouse gas emissions; however, the bill failed in the Senate after going through the House (Sussman & Daynes, 2013). There is the argument that if carbon tax or cap-and-trade policy was implemented at local level, it may have negative impact on the local economy in that businesses will relocate elsewhere to avoid the tax. The best level of implementation of carbon tax, therefore, is deemed to be either at the state or federal level.

8.3 Scale Jumping

'scale jumping' is a political act of liberation from confinement in a particular scale category. Neil Smith (1992;1996) used the term 'scale jumping' to describe how the homeless in New York, by gaining access to the homeless vehicle and policar, are able to liberate themselves from their confinement is space. Without the means for proper housing due to the

activities of the real estate sector, the homeless occupy spaces perceived to be public space, yet their presences in these spaces is contested. However, given the mobility that the homeless vehicle affords the homeless, it becomes a source of power to push back on effort to exclude them from certain spaces. When the homeless are not mobile they become trapped in space. The homeless vehicle then comes as means for the homeless to produce and reproduce their own urban space. By giving the homeless the ability to be more mobile, it opens up wider spaces to them and more opportunities for scavenging, panhandling and bottle collection. Also, the sleeping space becomes extensive and their exposure to police harassment and assault is limited.

Scale jumping is therefore a way of accessing power in the struggles by social agents to achieve their political goals. As has already been discussed above, local climate actors recognize that there are specific areas of action that are not within the jurisdictional control of their locality but are very important to the success of their climate mitigation. Thus, as part of their overall climate protection efforts, they try to influence those areas through the tiers of government that control them. Hence, there is a constant interaction across levels of governments in local climate action. Likewise, there are actions by other tiers of government that influence local level climate effort, either for better or for worse; hence, scale jumps could be up or down the scale ladder.

8.3.1 Actions by Local Governments to Circumvent Jurisdictional Barriers

One of the strategies that local climate mitigation efforts deploy to circumvent jurisdictional barriers is lobbying state or federal governments to pass enabling legislation. For instance, the city of Colorado started an advocacy group called the Colorado Community for Climate Action which focuses on lobbying state governments to pass legislation that support climate protection efforts at the local level. Some climate action managers state that there are some areas of action that they include in their climate action plans that they do not have direct

control over. However, they still include them because they believe they can advocate for the changes in the state laws that govern such phenomena. For instance, Oregon has a state energy building code and cities cannot adopt any mandatory codes that are more aggressive that the state requirements. The City of Portland, however, has been trying to help the state adopt a more aggressive code which yielded positive result as the governor of the state has passed an executive order, directing the update of the energy code.

However, it is not always the case that local governments can lobby state executive or legislature and be successful, at least it may depend of the issue area. In terms of climate action, this strategy of scale jumping may not be available to localities in highly conservative states. The following statement from the LCAPs manager of the city of Austin makes this point.

> No! this is part of the odd in some places, they may do that like if you are in Oregon. You are in a city in Oregon and the state government is also democratic and support theses stuff, so they can work together and collaborate with that. In Texas, it is the opposite, we have local control laws, where cities have control over certain things, and they are supposed to be left alone by state government. State government in Texas is crazy conservative, super crazy conservative, so we try to do everything we can do and stay out of their issues, off their radar, there is no reason to go over to the state capital and try to argue about climate change, it is not worth the time. (LCAP Manager, City of Austin, February 9, 2018)

LCAPs may also include actions that are not within the control of the local government and try to convince the authorities in charge to accommodate them through non-legislative advocacy and Partnerships. The climate action manager of the city of Baltimore points out that although they do not have absolute control over their transportation sector, they include action related to transportation in their climate action plan in strong words. They then communicate their position on these areas to their partners such as the state government or private

organizations, who may then incorporate them in their decision making. This may be a soft way of trying to effect change, but it is nevertheless a way of circumventing scalar boundaries.

8.3.2 Constructing new jurisdictions (new scale category)

Sometimes it may be more convenient for actors to construct a new scale category between scales. Due to the transboundary nature of commutes, and the lack of space in most cities to build renewable energy, it is deemed more suitable to create a regional scale jurisdiction involving a number of municipalities and counties to manage transport related emissions and grow renewable energy. According to the LCAPs manager of the city of Austin, many of the people who drive in Austin do not live there, but in surrounding counties and cities. In addition to not having the planning authority over the transboundary transportation activities, they don't even control the transportation authority. So, while cities may be described as the focal point for climate action, their abilities in the transportation sector may be limited. The city of Hannover in Germany attributes its potential of achieving carbon neutrality to the creation of the greater Hannover region. The region of Hannover was founded in the year 2001 or 2002, which includes the city of Hannover's 540,000 inhabitants, and those of other municipalities bringing the population of the region to about 1.2 million people. The idea is that since the city of Hannover itself is pretty much built up, the outlying hinterland, which is part of the greater Hannover region, will be the source of supply of its renewable energy.

8.3.3 Influence of Higher tiers of Government on LCAPs

One type of action from higher tiers of government that has influenced local climate effort is state legislation on climate change. In 2006, the State California passed the Global Warming Solution Act also known as AB32. This act is said to have spurred climate action at the

local level as well. The law says that the State of California will reduce its emissions by 80% below 1990 levels by 2050. Local governments taking action on climate change are also adopting similar emissions reduction targets.

> I mean is like the state is doing a significant amount and our actions in Mountain View are 100% tied to, I don't want to say tied, but certainly, the program was started because of AB32. That really got cities going and the state continues to have initiatives with electric vehicles, energy efficiency and renewable energy. You know the state is forcing the utilities to increase the amount of renewable energy at the source every five years. (LCAP Manager, City Mountain View, CA, February 17, 2018)

The climate manager of the city of Alameda opined that it is likely that their city would still be doing climate protection related action without the passing of AB32, given that they are a liberal city. He however, mentioned another state senate legislation – SB3 79 – which has far more reaching implication for local climate action. SB3 79 requires local governments to include climate change considerations in their health and safety elements, which means that all localities, irrespective of their political leanings, are required by law to take on some form of climate action.

The posturing of the executive branch of the Federal Government both rhetorically and materially towards climate change is believed to influence local climate mitigation efforts both in terms of the number of localities that are taking action, and the level of ambition of individual localities' actions. The actions, inactions, and rhetoric of the White House shapes local climate action efforts. While some climate managers opine that, for instance, the lack of action and the types of executive action produced by the White House are stalling climate action in general, others opine that such antagonistic posturing has provoked more local action.

> But if you ask that more generally, I think it has been interesting since June 1 last year when the president announced the US withdrawal from the Paris accord, that triggered a shift in the political conversation locally. for a long time, people have said the really need

> to do something about climate change and that announcement from the federal government I think helped shift that thinking to I really need to do something about that and there has been quite a bit more focused on sustainability issues from our mayor here. I think we have more inquiries from our residence around programs that we offer, I think it has given our office more attention and now it is up to us to make good on it (LCAP Manager, City of Cincinnati, February 5, 2018).

> I think the new administration has really gotten a lot of people's attention not in a good way, but I think it kind of catalyst people to want to do more at the local level. In a way, Trump may be a good thing for the environment, because people are just, you know, so frightened, so it's kind of different than what you think, I think he has really activated people to act in a lot of different areas (LCAP Manager, City of Columbia, SC, January 29, 2018).

State level political dynamics also influence local climate action efforts. Having pro-environment political leadership at the state level could be a significant facilitator of local climate action. Shifts in state governorships have been found to impact local climate actions in both positive and negative directions.

> For, a number of years we put millions of dollars into planning for a better public transport system to go though many of our low-income neighborhoods, where a lot of people don't have access to cars. When a new Republican governor was voted he just nixed it. We needed funding to enact this, after all the planning we had done, and he decided not to do it, so that was a major blow to our public transportation system in the city, especially low-income folks who needed it most to get to jobs in less than 45 minutes. (LCAP Manager, City of Baltimore, February 2, 2018)

Federal and state financial incentives; federal tax credits for renewable energy and electric vehicles and, most importantly, the Obama administration stimulus funding for local energy efficiency programs, are said to have had a huge positive impact on local climate protection efforts. Boulder County, which houses the city Boulder, received the 25-million-dollar grant and implemented energy efficiency programs. That was a huge sum of money and the county and city were able to spend 12 million dollars in three years on energy efficiency in both the residential and commercial sectors.

Federal and state governments have the resources to produce good and accurate data that localities can use in their climate action efforts. To understand the current and future dynamics and impact of climate change climate requires the constant observation and collection of data. Also, climate models are used to quantitatively simulate the complex interactions of the drivers of the earth's climate system – the atmosphere, oceans, land and glaciers. The data collection and research associated with climate change requires huge financial resources and local governments may not have the wherewithal to carry out such activities; hence federal and state activities in that regard has a significant impact on local climate action.

> We rely on the state and federal government to get the data we need to either track our emissions or to understand things that might be happening or where we can take action and, so, that is a way that they influence us, by either providing the data in a timely fashion or making that available. The work that we are doing in terms of the impacts of climate change, the State and NOAA have so much information that we need in order to help us understand those issue to prepare for the impacts that are coming. (LCAP Manager, City of Portland, OR, January 7, 2018)

8.4 The Production of Networks in Local Climate Protection

In Kevin Cox's (1998) quest is to locate local politics he made a compelling argument that the dimension of spatial politics and those of the tiers of the state are sometimes erroneously merged; the idea that "local politics is what local governments deal with" (p.1). He argues that given the relatively influential status of the local government in the local sphere, actors hoping to achieve certain local interests will normally strive to mobilize the support of the local state agencies, but this should not be taken as the limits of local politics. There are some equality influential actors that determine the shape of local politics besides agents of the local state; hence, the local state is just one among many other agents of local politics. Essentially, local politics is much broader and involves many more actors, perhaps located in distant places, than

portrayed by the compartmentalization of phenomena into the various tiers of state bureaucracy. Similarly, Leitner, et al. (2008) argue that agents of contentious politics are often connected horizontally across space and the alliances they form are not predefined by a specific spatiality – scale. It is for this reason that some postructuralist scholars have called for the adoption of flat ontologies in the examination of political struggles (Cameron & Hicks, 2014; Marston et al., 2005; Springer, 2014).

It is argued that things, ideas, and politics are not ontologically organized into a hierarchy of relations but exist in a horizontal structure of interaction. "Flat ontologies consist of self-organizing systems, or 'onto-genesis' where the dynamic properties of matter produce a multiplicity of complex relations and singularities that sometimes lead to the creation of new, unique events and entities, but more often to relatively redundant orders and practices" (Marston, Jones et al. 2005, p. 422). Politics takes place around "multiple sites of horizontal activity and autonomous resistance" (Springer 2014, p. 409). There is also the notion that scalar thinking obscures or prevents other political possibilities. It can perpetuate the subordination of the subaltern because of the limited political possibilities it presents. Cameron & Hicks (2014) argue that the contributions of seemingly minute grassroots renewable energy initiatives to addressing climate change tend to be overlooked when scalar perspectives are adopted in analyzing climate action.

Networks have been offered as the theoretical alternative to scalar thinking. "Network thinking, then, is associated with a distinctive kind of geometry—one that stretches horizontally across the map and that questions the very categories of global and local – and thereby place and scale" (Sheppard, 2002, p. 317). Networks thinking is not only viewed to be consistent with the real ontology of spatial interactions but also, site-specific relationships and connections with

distant phenomena that are part of the given political struggle are taken into consideration – 'spaces of dependence' and 'spaces of engagement' (Cox, 1998).

However, if scale is viewed as a practice, deployed by agents in political struggles, networks exits as another spatial dimension, rather than an opponent of scale. While actors are practicing scale, they are involved in networks at the same time, as part of the maneuvers in political struggles. Networks in local climate protection may exist in local, place-based interactions or partnership; or more extensive 'global' connections such as trans-municipal climate action networks.

8.4.1 The importance of Networking in Local Climate Action

The previous sections in this chapter discussed the vertical interactions that take place across tiers of government in climate protection efforts. This section discusses the horizontal networks that are produced and reproduce in the localities' effort to mitigate climate change. The development and implementation of LCAPs is imbedded in all kinds of partnerships and networks. It is therefore important to highlight some of the key roles that these networks play in the success or otherwise of local climate mitigation efforts.

Some of the local partners such as NGOs act as pressure groups in getting local governments to be more ambitious or aggressive in their climate protection efforts. For instance, Community Action for a Sustainable Alameda (CASA), a community wide coalition, has been very instrumental to Alameda's climate protection efforts. CASA has been very active and worked closely with the city on many of their sustainability and climate action programs. In fact, in some cases, some of the programs would not have been done had it not been for CASA.

> I believe for this current plan update it was CASA's correspondence and recommendation to city council to reexamine the climate plan that got the ball rolling in the first place, so I will say that those community partners are very important for the city's action on climate protection. (LCAP Manager, Alameda County, February 5, 2018)

> I said governments are very slow-moving bureaucracies, they are very risk averse and it really takes some time. I would say unfortunately sometimes it takes outside pressure to get things done, that is just how it is. (LCAP Manager, City of Miami-Dade County, FL, February 9, 2018)

Local governments also form partnerships with other non-state actors to build legitimacy and public confidence in climate protection efforts. The more diverse the actors the more currency that climate protection efforts get. For instance, according to the LCAPs manager of Albemarle County, their collaboration with the University of Virginia staff has given their LCAP more credibility, especially in the eyes of the business community. Also, the city of Columbia, South Carolina pointed out that working with the big businesses has set a good example for others to come aboard. In addition, Montgomery County talk of their partnerships with "what might seem like an unusual partner" such as, businesses and the local chamber of commerce, which gives their climate actions credibility in the commercial sector.

Information sharing, and research is another important reason and benefit of forming networks and partnerships in local climate action. In the formation of LCAPs, some cities partner with research organizations such as the Potsdam Institute for Climate Impact Research, in the case of the city of Berlin, and Universities. They rely on these organizations not only for research partnerships such as, conducting feasibility studies, but also, for data to track their GHG emissions. Besides networks such as ICLEI, C40 cities, the Covenant of Mayors, there are also more local intermunicipal networks of cities that have proven useful to local climate efforts with respect to information sharing. Alameda county has a joint power authority called Stop Waste

and they convene a couple of councils, technical advisory committees and groups engage in peer information sharing, best practice sharing, and provide directions for municipal sustainability staff in Alameda County.

Being in constant touch and partnering with other organizations that are interested in climate protection actions can prevent the duplication of programs, thereby saving time and resources for more programs. Through partnerships with residents, colleges, federal labs, nonprofits and research organization, resources can be pulled together to get a lot more work done.

> It is critical, because there are so many organizations across our communities that are passionate and are doing a lot of work and so we don't duplicate, replicate and we don't want to confuse our community. So, it is critical to leverage our messaging and our funding to ensure that you can maximize what you have. (LCAP Manager, City of Boulder, January 22, 2018)

Through partnerships, the City of Roanoke was able to consolidate its local weatherization program called TAP with those of stakeholders, such as Appalachian Power, the electric utility; Roanoke Gas, the gas provider; the regional commission and renovation alliance; and the Better Buildings Challenge, a private energy practice. The different programs, tools and resources, which hitherto existed in a mosaic across different actors now formed one large program hosted on a single website. Residents and businesses were then offered products in packages, giving them about 15% to 20% savings. All these organizations coming together and consolidating their programs made accessing energy and climate related programs handier for residents and businesses.

Directly enrolling the major GHG emissions contributors into LCAPs activities is one of the importance of networks. This involves creating cordial relationships with large GHG

emitters. Forming a good relationship with the large GHG emitters and striving to influence them to reduce their GHG load through energy efficiency and transition to renewable energy is a worthy course of action. For example, the University of Vermont is one of the top three electricity users in the City of Burlington, so establishing a good relationship with them is important.

> We have the Clean and Green Business Coalition, so we partnered; we had a city council person and local business man that joined together and invited the top 10 employers from the city of Roanoke. They talked to the CEOs and the presidents of those organizations, and they called them to come together for a five-year challenge to reduce their GHG emissions by 20%. This group met about every six months for five years and reported their GHG emissions every year for five years. We collated that and worked with a professor at Virginia tech and put that into an aggregate amount and looked at it. What we did was, we took the business cases from the different business or best practices from the different business to prepare a business case for sustainable business practices and this was really a powerful program. We had a local healthcare provider, we had a local law firm, we had an auto dealership, we had the sporting and clothing company, and a whole host of different community members that came together and shared their best practices and talked a couple of times a year about different initiatives that they had done to aggressively lower their energy consumption, improve their recycling, improve transportation practices. So after two years they reached their goal and by the end of the 5th year they actually exceeded their goal of the 20% GHG emissions reduction. We are actually at 32% and its saved millions of dollars and avoided energy cost so that was a supper successful program and it got a lot publicity and we have shared some of the practices of the program with a lot of other communities and really did a lot to elevate the understanding in our community on some of the value of these practices. (LCAP Manager, City of Roanoke, VA, January 11, 2018)

Another importance of forming partnerships, especially with non-state actors is the ability of such actors to do things that local governments may not do; perhaps for reasons such as political expediency or grands and funding opportunities that local governments are not qualified to access. Partnerships with local civil society groups, universities and businesses, have enabled localities take up such actions; thereby opening up more political possibilities. For instance, the local renewable energy league brought Leonardo DiCaprio's film on climate change to the City

of Charlottesville for a viewing, which in the view of the climate protection manager, would not have been an appropriate thing for the city's sustainability office to do.

> Sometimes there is need for advocacy on a political issue and it wouldn't really be appropriate for city staff to weigh in. You know, I think government is risk intolerant and having non-profit and business partners who have a little bit more appetite for risk is pretty helpful. We have a local non-profit here who launched a bike share program and the fact that they are not within government has enabled them to be more flexible on their roll out. They can ride on the Ohio rivers and go across rivers and different jurisdictions into Kentucky. The fact that red bike was a non-profit made it fairly easy to expand to Kentucky, had it been a city own asset, that would have been a little bit more challenging. (LCAP Manager, City of Cincinnati, February 5, 2018).

Building partnerships and networks in climate protection can be a source of access to expert knowledge and assistance on programs such as energy efficiency and renewable energy. For instance, localities use the expert guidance of organization such as the US green building council on how to tackle energy efficiency within government organizations and the community as whole.

Furthermore, partnerships and networks can deal with debilitating problem in local climate action. Most climate protection offices complain about the fact that they have so much to do but without the right number of staffs to taken on all the tasks. Joining networks of cities dedicated to climate action and building partnerships with non-profits and other organizations that are also interested in climate work can be a way of dealing with the staffing problem.

> My office is myself and one other person, so we have to partner on everything because we just don't have the resources to do all that much on our own. I mentioned Duke university is right here, I certainly use students and faculty to do projects and analysis for me. (LCAP Manager, City of Durham, NC, January 29, 2018)

Again, forming partnerships and joining networks can be one way of dealing one of the fundamental problems of local climate action – funding. As has been mentioned elsewhere, some

of the local utility companies that are even investor owned have been a source of funding for LCAPs' energy efficiency programs. For instance, Duke energy in the city of Durham, provides resources for small to medium sized business to retrofit their buildings, among other incentives. These funding opportunities created through the deliberate construction of partnerships with those organization.

8.4.2 Trans-Municipal Networks

As discussed in previous chapters, Trans-municipal networks have been very instrumental in the development and implementation of LCAPs. TMNs have been instrumental in getting localities to take the initial step of committing to act on climate change. Local climate action has typically occurred in waves, largely through the formation of TMNs. The first wave globally, was through ICLEI's CCP campaign. In the U.S in particularly it was through the Council of Mayors climate protection agreement. Part of the objectives of these networks is to galvanizing local governments to make commitments to climate protection.

Another important characteristic of TMNs is their resourcefulness in terms of providing expert knowledge and technical support for localities. ICLEI is identified by local climate action managers as the most useful TMN for that purpose. They are also viewed as a repository of knowledge on diverse practical experiences on climate protection actions. Besides serving as the framework around which localities commit to act on climate change, they serve as a resource when it comes to taking actual action. ICLEI has been very instrumental in guiding municipalities develop their climate action plans. ICLEI played a huge role for cities; helping in their initial inventories and helping get things done. While most of the localities that are far along in their climate action efforts no longer find ICLEI very useful and, for that matter are no longer members, the organization is still very instrumental, especially to small cities and those

now just beginning to take up climate action. ICLEI is particularly useful in providing guidance on developing the GHG emissions inventories. They have a software that helps localities conduct their GHG emissions inventories.

Peer-to-peer Learning is yet another importance of TMNs. climate protection and other sustainability actions at the local level are fairly new, and almost all localities are sought of still figuring thing out in this space. Hence, the peer-to-peer learning opportunity presented by TMNs is considered as invaluable. This means that individual localities do not have to reinvent the proverbial wheel when it comes to certain issues; they can simply learn from the experiences of other cities within the network. The organization in the United States that LCAPs managers find the most useful in this regard is the Urban Sustainability Directors Network (USDN). Climate managers find the learning experience they get from the conferences they organize very rewarding, as it presents the opportunity for peer-to-peer networking, information gathering and information sharing. Climate managers particularly like the fact that the conferences are organized at least twice a year and the topics discussed are usually the ones that members are the most interested in. They also find USDN more useful because it is US based and, so, each city can relate better with the experiences of other member cities, rather than in the case of a global organization where for instance, the experiences of a cities such as Paris and Dubai may not be as relatable. They argue that it is more credible when you know that other cities within the country are doing it, rather than drawing examples from say, Berlin or other distant places.

TMNs also provide a 'sanctuary space' climate protection managers. Another important feature is the accessibility to other localities that has been afforded. Climate managers point out that they draw moral support from the connections that TMNs have afforded them; working with like-minded people across the country. They say sometimes, they just want to be in a space

where everyone understands and support what they are doing, celebrate with them in their successes and help them solve their problems.

Some TMNs are hubs for data reporting such as GHG emissions inventories. This creates the avenue for comparison among localities and the supply of data for research purposes. For instance, part of the requirements of being a member of the global Covenant of Mayors is to report your GHG emissions on the platform, together with its over 8000-member localities across the world.

Other TMNs are more regional which offers the opportunity for collaborative activities. For instance, the Green Cities California led the way years ago in helping local jurisdictions adopt bans on disposable plastic bags. They were able to secure some foundation funding to prepare environmental analysis and they are currently helping member cities to study building electrification. The Southeast Sustainability Directors Network (SSDN) started the green challenge which is a collaboration of nine different SSDN members. This program was adapted from the Nashville's Mayor's Work Place Challenge which was presented at one of the annual meetings of the SSDN. A good number of the members of the SSDN developed interest for the program after the presentation and decided to apply for a grand collectively to start a SSND version. There is also the Southeast Florida Regional Climate Change Compact composed of four counties; Brower County, Miami-Dade County, Palm Beach and Monroe County. Members work closely; they organize at least a call between staff of all the member counties every week.

> I will just tell the story of how it all started. So, I think there were some staff members from one county who went to the federal government, some office at the federal government, to try to lobby for some money for sea level rise something and, at the office, what did they see? they see somebody from another neighboring county doing the very same thing. They then said well, this is kind of silly, we should be working together. Not only that, when they were going to the federal level to request money, they were each using slightly different maps. So, for example, we have what we call the sea level rise

> projections, so each county was using slightly different projections. When you are doing projection, you make different assumptions and you use different methodology, so they all decided to all work together to develop a regional projection and that is a much stronger message when you go ask for money either from the federal government, the state government or even local foundation. Having that unified approach is very helpful. (LCAP Manager, Miami-Dade County, FL, February 9, 2018)

Some networks are largely political and for the purpose of boosting the reputation of the locality with regard to climate action. Although a network such as the C40 cities is useful for climate action staff it is more useful for the city mayors. It provides the mayors with the national and international platform to connect with other mayors and political leads to possibly come up with some progressive decisions on climate change.

> It is important for Portland to be a member and participate in that work because it puts us together with other large, international cities that are really aggressively working on this. So, we can learn from them, but also, it is just important maintaining our reputation and our own sort of commitment to staying on that front, and in leaderships and, so, C40 and others like that really just help us to do that on a larger world stage beyond the U.S. And there is some great value too, like especially through C40 it is a great way to get elected official to get excited about this work, they get to integrate and, it is very powerful for your mayor to travel somewhere and meet with mayors of other big cities in the world and sort of feel like they are part of a larger movement, it helps them when they come back home to be really supportive of aggressive action like banning the fossil fuel infrastructure for example. (LCAP Manager, City of Portland, OR, January 7, 2018)

8.5 Conclusion

Chapter seven delved into the issue of jurisdictional capacity of local governments. The chapter started off by trying to identify the reasons why the local scale is considered as suitable to climate protection efforts. It then went into ascertaining some of the areas of climate action that are deemed as inherently within the domain of local action. The chapter also revealed that there are certain issues or areas of action important to the goals of the LCAPs but seen as

existing outside the domain of the local scale; in such circumstances, local climate protection measures may include strategies to navigate these jurisdictional barriers.

The chapter also highlighted the lateral partnerships and networks that are constructed as part of the local climate mitigation process. In addition, special attention is given to TMNs given that they have been very instrumental in, not only increasing the number of localities embarking on climate protection measures, but also, the facilitating their successes. Agency in climate protection, and any policy action for that matter does not lie solely with the state-tiers of authority, other actors – private industries and non-profit organizations – and spheres of authority – transmunicipal networks are equally involved. There is therefore said to be multiple sites of 'spheres of authority'(Rosenau 1997) competing and cooperating in the bid to address global environmental issues. These shifts demonstrate that although state's political authority is significant, the practice of politics is not limited to it (Wapner 1996).

The decision to act, the types of actions that constitute areas of action, and the types of policy instruments that are deployed are informed by this scale practice.

9 Discussion and Conclusion

9.1 Introduction

Climate change governance often comes with the question of scale. There have been competing arguments in respect of which scale is the most suitable for climate action. In more recent times, perhaps following the failures of global regimes such as the Kyoto protocol and other Conferences of Parties to the UNFCC, it has increasingly been argued that the local scale is the most suitable site for action to mitigate climate change. To test this argument empirically, it is important to put the concept of scale into proper perspective. The idea of a scaled world, particularly, in the form of urban, national and global scales seems to be a matter of common sense. Yet what constitutes the urban, national, etc. scales are not often clear cut in terms of their constituents, and spatial limits – where the boundary of one scale category ends and the other begins – or even whether such have a real existence. Geographers have grappled with the concept of scale for the past three decades, yet the fundamental question of what scale is has yet to be answered. Hence before delving into the issue of which scale is the most suitable for climate governance, in fact, for that exercise to even be possible, the question of what scale is needs to be addressed. This dissertation therefore began by taking on the concept of geographic with the hope to bring clarity to it and set the stage for the empirical examination of the local climate protection efforts.

The dissertation took the position that rather than adding to the confusing by attempting to answer the question, 'what is scale?', better clarity could be brought to the concept by examining how it has been deployed by geographers empirically. After exploring the theoretical arguments, particularly bothering on the ontological and epistemological status of scale, the empirical applications of scale where examined. It emerged that what geographers or any other scale

analyst for that matter, have done in the empirical examination of scale has, in fact, been an analysis of scale practices. The analysis or examination of the scale practices of actors in given political struggle. Herod's analysis of labor relations in the United during the New Deal Era; Howitt's examination of Aboriginal people's employment in the mining industry in the Australia; and Miller's study on the peace movement in Cambridge Massachusetts are all analyses of the scale practices of actors in those political struggles.

The idea is that scale practice is one of the key aspects of the struggles in global climate change governance. Scaling is a practical means by which humans make meaning of a rather complex world. Scale practice is the invocation of imagined or real hierarchical spatio-institutional arrangements by actors in a given political struggle to manage social relations. In this, case the political struggle is climate change governance; and the imagined and real hierarchical spatio-institutional arrangements are the discursive 'global', 'national', 'local'/'urban', etc. and the adoption of the scaled tiers of the state respectively, in climate change governance. Based on the deployment of the scaled tiers of the state by actors in climate protection efforts, the study therefore proceeded to discuss the suitability of the local scale for climate protection in terms of the innovation of climate action plans and the efficacy of local climate action plans both quantitatively and qualitatively.

9.2 The implication for Local Climate Policy Innovation

After having established that scale is a practice, in this case the adoption of the scaled tiers of the state in climate mitigation action, the main task was to examine LCAPs innovation in the United States as part of assessing their efficacy in bringing about meaning GHG reduction towards the global goal of climate change mitigation.

Reviewing climate change policy and politics in the United States from president Jimmy Carter, who is believed to be the first United State president to use the term climate change in a presidential speech, to President Donald Trump, the politics that has ensured resembles that which comes with morally defined issues such as abortions, same sex marriage, death penalty and more recently animal rights; hence climate change policy falls under the so called moral politics. In a nutshell, pioneering localities' decision to innovate climate change policy was largely informed by its morally informed political ideology rather than a rational examination of the material pros and cons of innovation.

From the review of literature and newspaper reports it is clear that the national politics of climate change had a significant impact on the local climate action. A good example of this is assault of the Tea Party wing of the Republican party on climate change and the UN Local Agenda 21. This anti climate change campaign impacted the number of localities joining ICLEI, the pioneering transnational municipal network that galvanized localities to take action on climate change. In some case, some localities that had started climate action put an end to it due to the Tea Party Campaign. Another example of the impact of national politics on local climate action, more on the positive side of the spectrum, is the first wave of cities committing to climate action through the US Conference of Mayors Climate Protection Agreement. When the Federal government fail to be part of the Kyoto Protocol in 2005, local governments saw it a duty to fill the leadership gap. This energization of local actors again was displayed in the aftermath of the US withdrawal from the Paris Accord.

Empirically, the study therefore took the position that pioneering cities' innovation of climate action plans was based on an estimation of the dominant political ideology of inhabitants of the locality, rather than rational considerations of the merits or otherwise of taking action,

based on the internal material conditions of the locality, such as ecological vulnerability or industrial activity. The GIS analysis revealed that local governments with climate mitigation efforts are overwhelmingly in counties that voted democratic in the 2012 presidential elections, implying that most of the inhabitants are more likely to be ideologically liberal and would support the decision to take action on climate change. Also, when climate action managers where specifically asked what may have motivated their local governments to act on climate change, their responses bordered on having a progressive community, progressive mayors, a history of environmental activity and having active environmental civil society; which are all connected to the liberal ideals of American politics. This point was particularly more telling when some of the climate managers stated that climate change was not necessarily an issue that their community members were aware of or understood at the time, but the leadership was confident that their citizens will support anything pro-environment. This goes to back the position that it was more of the ideological politics that informed local climate policy innovation rather that rationally though out projections of material outcomes of taking action.

All the climate action managers interviewed in this study were located in democratic learning counties, so it is not surprising that all the factors that were mentioned as constituting their reasons for taking action bordered on their liberal characteristics. That notwithstanding, the expectation would have been that if indeed localities cautiously considered the material benefits of taking action, mention would have been made ecological factors such as the vulnerability of the localities to the impacts of climate change, due to their history of environmental stress or hazards.

From the GIS analysis there were five localities with climate mitigation action in the Mid-West were located in red counties; although only two were in deep red counties. Similarly,

in the South, three localities with climate actions were found in red counties, but also in the lighter red counties. The location of these localities in lighter red counties may imply that the gap between the two dominant political views may not be that wide among inhabitants of the county. It could also be a shorting of trying to approximate the political learning of a city using county election results. It could be the case that the localities' political learnings are not the same as the entire county. However, it would have been revealing to conduct interviews with the climate managers of those localities to get a deeper understanding of why they adopted climate action plans in those early days. Perhaps, this could reveal ecologically related reasons for taking action.

One of the important revelations of the GIS analysis is the fact that there is a significant number of localities in republican leaning counties with sustainability action plans unlike climate action plans. This could be an indication that conservative leaning localities may be more receptive to the notion of sustainability as compared to climate change mitigation. This points to the fact that although overall environmentalism is more likely in liberal leaning localities than conservative ones, the special (moral/radical) politicization climate change may have made climate protection almost exclusively an issue pursued by liberal leaning localities.

Sustainability emphasizes an enhancement of the overall livability of the locality and wellbeing of its inhabitants; hence, the impression is that it generates more immediate benefits; rather than the fulfilment of the some 'distant' global climate protection. As a result, conservative localities may not necessarily find the adoption of sustainability measures as antithetical to their dominant ideological or political beliefs, as may be the case in taking up climate mitigation. In updates of their climate action plans, some localities are either constructing their climate mitigation efforts in the broader context of sustainability or

emphasizing the elements of co-benefits in other to generates more public appeal and take away the politics associated with the mention of climate change. Perhaps, adopting the concept of sustainability as the broader theme of a locality's climate mitigation efforts may be one of the ways forward in increasing the numbers of local climate action innovation.

Although the science of climate change is becoming more evident with the increasing incidents of severe weather and other environmental hazards, one on of the important take-aways of this chapter with regard to facilitating an increase in the number of innovations of local climate mitigation policy is to change the politics around climate change. In respect of local climate mitigation efforts, the theme of the whole exercise can be shifted to a relatively less politically contentious concept such as sustainability. Another way maybe to emphasize the co-benefits element of climate change mitigation when persuading individuals, communities and businesses to take action.

9.3 Implications for Areas of Action and Policy Instruments

Relying on localities' webpages on their climate mitigation efforts, policy documents, progress reports and in-depth interviews with climate protection managers, the processes of LCAPs formation were examined; highlighting some of the changes that have taken place in updated plans, the various areas of action and the types of policy instruments deployed to reach the goals of each action area.

Although LCAPs typically vary in scope, targets and the tracking of progress, they tend to be similar in many ways globally especially in terms of areas of action and policy instruments. The areas of action typically include, energy efficiency, renewable energy, transportation, waste and land use. Recently, equity, community engagement and forestry have become popular additions to the areas of action.

With regard to climate action, the type of policy instruments that are deployed is largely due to the political authority of the local governments in general and the nature of the issue of climate change. As has been discussed above, the coercive power of local governments is somewhat limited, hence, regulation which includes the threat of sanctions for non-compliance is hardly an option available to local governments. Information policy instruments such as the transfer of knowledge, persuasive arguments or exhortation, mostly crafted and delivered in a manner that seeks to make compliances with the desired behavior more likely, are the most relied upon in local climate action.

The legitimacy of climate change as a pressing social problem also influences the type of policy instruments that are deployed. In situation where the legitimacy of a given issue is yet to gain strong grounds among the population, an important strategy would be to first introduce the least coercive instruments to make the issue more familiar and weaken the resistance against it; which explains why the most relied upon policy instruments are of the information type. The idea is that using less coercive policy instruments in the early stages of a policy paves the way for their introduction in the near future.

9.4 The implication for Climate Action Efficacy

The local scale has been increasingly touted as the source and solution to the problem of climate change, leading to an increase in the number of TMNs for climate protection and treaties among local governments committing to take mitigation measures. The study therefore sought to evaluate how pioneering local governments have done quantitative with regard to their GHG emissions reduction. It also qualitatively examined the opportunities and challenges their efforts have encountered, as well as the funding avenues available for local climate action. It was revealed in this endeavor that while individual localities have the potential of reducing their

GHG emissions, cumulatively, it doesn't look like local action alone can make up the required national or global emissions reduction. First, not all localities globally have committed to climate mitigation; second, not all localities that have made various commitments have proceeded to develop plans and actively pursue mitigation measures; third, not all localities that are actively pursuing mitigation measures have high enough ambitions or enabling local conditions that will yield meaningful reduction in GHG emissions.

The Dissertation also highlighted the varying successes of the various sectors in the efforts to reduce GHG emissions. While the transportation sector is widely reported as the most GHG producing sector, it is also the most difficult sector to achieved emissions reduction. The waste sector on the other hand, which happens to be the least GHG contributing sector, is also the sector with the most success in GHG emissions reduction.

9.4.1 The Way Forward to Enhance Local Climate Protection efforts

Based on the analysis of the quantitative and qualitative examination of the LCAPs the areas that need to be tackled to improve the efficacy of LCAPs are identified. Well Developed Plan: Having a well-structured plan with goals and monitoring mechanism has long been identified as important to program success. This factor has been confirmed in climate protection efforts given that localities that were successful in reducing their GHG emissions have consistently monitored their actions and made updates to their plans.

- Getting states to play an enabling role: Particularly important in this regard is getting states to pass laws that will make it easier for municipalities to develop their own utilities and oversee purchasing their own electricity. This is important because changing the energy source is one of the most significant ways of reducing GHG emissions, which is controlled by the utility supplier. Another area where states can enable is providing tax credits for the purchase of

electric vehicles. When municipalities then anticipate an increase in the purchase of electric vehicle due to their cost competitiveness then they can go ahead and provide the needed infrastructure.

- Finding Innovative ways of Securing Funding. Funding is evidently high up the list when it comes to the needs of local climate protection efforts. Local governments don't tend to have extra funding at their disposal, so grants or funding for their climate protection efforts is always in want. This means that they have to come up with innovative was of securing funding. For instance, with the city of Baltimore they always secured some grand either from the city, state or private sector for specific programs and once the program was up and running they would find a way of convincing the municipal government that project is important and needs to be kept going; eventually the person working on the project is kept on as city staff. They also make creative grant writing a priority, largely through the type of staff they hire. Another useful strategy they have devised is to develop a relationship of trust with their financiers by being creative and producing visible results. Some cities have found it useful to hire a consultant to help understand what funding options are available to them. A case in this regard is the city of Boulder where their decision to introduce the climate action tax plan, which was overwhelmingly approved by the city council and passed by voters, was the product of a funding consultant. Boulder's climate action plan tax generates about 1.8 million dollars annually.
- Generating political will: The role of political will in climate protection efforts cannot be over emphasized, particularly in the United States where climate change has been heavily politicized. This pollical support is not only needed from the municipal government, but also the state as well as the federal government.

- Generating public support: Sometimes before decision makers will throw their weight behind a given policy, they weigh the issue's public appeal. Generating public support does not only enhance political will the over public participation in the action taken to mitigate climate change.
- Support System for Localities: ICLEI over the years has been an important support system for localities, particularly in terms of conducting inventories. Hence providing services that can be broadly offered to localities committed to reducing GHG emissions is important.
- Communicating Climate Change: The slogan of the city of Freiburg's Nature Trail captures the importance of communication to the efficacy of environmental protection measures and climate protection for that matter. "You only see what you 're aware of, and you only protect what you know" (City of Freiburg).

9.5 The implication for jurisdictional capacity and the scale theory

This dissertation has demonstrated scale practice and networks construction in local climate change governance. The overarching argument is that there is no organic or automatic scale out there where phenomena such as climate protection fit, but what constitutes a give scale is defined by the actors in their attempts to address a given social problem. In the case of the climate mitigation efforts, the local scale is predominantly based on the adoption of policy by the local state tier of scale and the jurisdictional authority of the local state may then be used as the criteria for deciding what should be included in a given scale category.

The scale practice is made evident in the examination of local policy innovation. Climate change politics in terms of the discourse and the policy action at the national level in the United States from the outset had been politicized. This politicization reflected in the adoption of local climate action plans by pioneering cities in the United States. Although largely influence by the

national political discourse, it is the local specific political ideological leaning of inhabitants that determined the innovation of LCAPs. Understanding scale practice engenders an understanding of why certain policy decisions are made.

Scale practice is also revealed or is useful in the determination of the areas of action and the policy instruments that would be deployed in achieving specific goals. When actors decide on what areas of actions they should or should not include in their climate protection measures, it is based on scale practice. Also, it is based on this scale awareness that the decision on which type of policy instruments will be selected are made. For instance, based on the recognition that the local state scale generally lacks authoritative power, the most used policy instrument is information.

However, determining the scale category a given phenomenon belongs to is not a straightforward matter. For instance, setting building code standards in some cases is considered as a local state matter in other instances, it is deemed as within the sphere of the state government. In fact, other times, the use of the state tiers of authority in demarcating what should constitute a phenomenon of the local government is contested. That is, although actors may acknowledge that the phenomena are within the authority of other tiers of government, they contest it and argue that it should rather be within the sphere of the local state. Scale is therefore not fixed, universal, neutral or the preserve of geography, but "the products of economic, political and social activities and relationships; as such, they are as changeable as those relationships themselves" (Smith, 1995: 60–61).

The dissertation also revealed that once scales are constructed and the parameters and the constitutes of the given scale are defined, with respect to any given political struggle, in this case climate protection, these constituents of the various scale categories do not remain confined in

them. Actors constantly interact with other actors and agents above and below the scale categories to which they belong. In some cases, new scale categories are constructed in-between the adopted scale categories to accommodate other phenomena. While these vertical interactions between scale categories are ongoing, there are horizontal interactions across scale with other more lateral sphere of authorities – networks – which are equally importance to the given political struggle. In a nutshell, scales and networks are dimensions of spatial practices by actors in addressing social problems.

9.6 Conclusion

There are a lot localities that are joining networks of agreements for climate protection. However, the number of localities that are taking real action is substantially low, such that if their action were fitted together like a jig-saw puzzle their contributions will not move the needle in global climate change mitigation. Particularly, in the United States, the issue of climate change has been hugely politicized, thereby making the widespread innovation of LCAPs difficult. Even in situations where localities are actively pursuing climate mitigation, there are mediating conditions that hinder their progress. Some of these challenging conditions are external, and it is not within the capacity of localities to control them.

Although the "geographical-institutional arrangements" (Swyngedouw, 2004) of the locality presents a practical medium for climate protection to be initiated, the presentation of the 'city'/ 'urban'/ 'local' scale as though it were a uniform platform across the globe, with already existing 'willing' and 'capable' attributes to deliver the goal of the Paris Accord of keeping global average temperature increase below 2□ C, is untenable. While localities have the potential of reducing their GHG emissions, in the practical sense, the promise often touted by the

discursive deployment of the ‘local’, ‘city’, ‘urban’ etc. as the curative platforms of global climate change may be an overstretch.

In conclusion, local actions may have to occur simultaneously with action take place at other tiers of government or institutional arrangements, if the global goal of climate change mitigation will be achieved. The actions of other tiers of government or institutional arrangements will not only be to take care of those GHG producing activities that are not within the control of localities, but also, to enable or enhance the capacities of localities themselves in their own mitigation efforts.

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11 Appendix

UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

November 10, 2015

MEMORANDUM

TO:	Mark Anthony Ayure-Inga Agana Fiona Davidson
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	15-10-235
Protocol Title:	*Climate Change Governance and the Politics of Scale: An Empirical Assessment of Local Climate Plans in Germany and the United States*
Review Type:	☒ EXEMPT ☐ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 11/06/2015 Expiration Date: 11/05/2016

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (https://vpred.uark.edu/units/rscp/index.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 20 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or irb@uark.edu.

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UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

May 26, 2017

MEMORANDUM

TO:	Mark Anthony Ayure-Inga Agana Fiona Davidson
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	17-05-692
Protocol Title:	*Climate Change Governance and the Politics of Scale: An Empirical Assessment of Local Climate Plans in Germany and the United States*
Review Type:	☒ EXEMPT ☐ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 05/26/2017 Expiration Date: 05/25/2018

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (https://vpred.uark.edu/units/rscp/index.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 40 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 109 MLKG Building, 5-2208, or irb@uark.edu.

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